

MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society.

VOL. XIV

NOVEMBER, 1931

No. 11

THE PRESENT STATUS OF THE TREATMENT OF CARCINOMA OF THE UTERUS*

GEORGE GRAY WARD, M.D., F.A.C.S.

Chief Surgeon, Woman's Hospital, New York; Professor of Obstetrics and Gynecology,
Cornell University Medical College, New York City
New York City

IN ACCEPTING the invitation to give the "Citizen's Aid Society Memorial Cancer Lecture" before the Minnesota State Medical Association, I am deeply sensible of the honor conferred upon me, and while appreciating greatly the implied recognition of my fitness to speak authoritatively on the subject of cancer, nevertheless I have had much hesitancy in doing so in view of the comparative small field of opportunity we have at the Woman's Hospital as compared to the great radiological centers in Stockholm, Paris, Munich and New York.

These and the other large centers, with their extensive equipment and full time staffs of scientists trained in physical and clinical research, should be the source from which will emanate the knowledge and extended experience which will ultimately enable us to conquer this most dreadful scourge which is an ever increasing menace to the civilized world. Nevertheless, I do not believe that the establishment of numbers of such centers, geographically distributed as has been advocated, will suffice for treating all cancer patients.

These centers will naturally draw to them a large number afflicted with cancer, but even when such special cancer clinics are greatly multiplied, it will never be possible for them to treat the vast number of sufferers who are to be found in every community throughout the land. It is obvious then that for the many patients who cannot be cared for by these centers we must provide proper adequate treatment in our general hospitals throughout the country, and therefore

cancer clinics with the necessary facilities and equipment must be established in these hospitals, and members of the staff must be educated to a proper appreciation of the complexities of this disease and trained in the most approved technic, if we are to give the cancer sufferer a chance for his life.

The cancer clinic then in a general or special hospital I believe has a distinct field of usefulness to the community and is an absolute necessity. Furthermore, in these smaller clinics the thorough and complete carrying out of a technic, or line of therapy and follow-up, may often be more possible than in the larger centers on account of the feasibility of a more continuous personal contact between the clinician and the patient throughout the long period of observation necessary.

Regaud, in charge of the Paris Clinic, recognizes this inevitable need for the establishing of facilities for radiotherapy in gynecological clinics, but stresses the importance of a close liaison between each of these clinics and one of the great radiotherapeutic institutions of the country, with which viewpoint I heartily agree as I believe it is to their mutual advantage.

In the whole medical world there is no more important subject requiring prompt solution than the control of cancer. It has been estimated that there are 360,000 people suffering from cancer today in the United States, and it now holds the second place in the cause of death. According to Hoffman in forty-nine cities of the United States the average increase in twenty-five years has been about 2.5 per cent in spite of modern methods of treatment. In New York City the deaths from cancer last year were 113.9 per

*Citizen's Aid Society Memorial Cancer Lecture. Read before the Minnesota State Medical Association, Minneapolis, May 5, 1931.

100,000, while in your own city of Minneapolis the high rate of 142.6 per 100,000 was reached, and in St. Paul, your neighbor, the rate was 121.5 per 100,000.

While cancer is a disease that attacks all parts of the body, about 25 per cent of cancer deaths in women are due to cancer of the uterus and the average duration of life is about twenty to twenty-four months when not treated. We, as gynecologists, are especially interested in cancer of the uterus and it is therefore upon that phase of the subject that I wish to speak.

As cancer of the uterus is a type of the disease which every general practitioner encounters in his daily work, it is largely to him that we must look for the early recognition of the disease and the education of his patients to the importance of promptly seeking a diagnosis on the appearance of suspicious symptoms, and as a large number of these patients are being improperly treated today, either by surgery or radiotherapy, by men who have not a proper conception of the complexities of the problem, I propose to give a survey of the present status of the treatment as we understand it in the hope that a more lucid appreciation of the difficulties of the treatment will prevail.

We must appreciate that the disease originating in the cervix and that arising in the fundus must be considered separately, as the clinical course and result of treatment are quite different in each.

CANCER OF THE CERVIX

Cancer of the cervix by reason of the anatomical conditions is by far the most dangerous form and the most difficult to cure, and is also the most frequent. At the outset we must admit that the results of treatment of cancer of the cervix are far from satisfactory, but at the same time we must appreciate that there has been a considerable gain in the percentages of cures and palliations as a result of modern methods. The treatment today resolves itself into a choice of surgery or radiotherapy (either radium or X-ray), and any of these agents may be combined.

Treatment by Surgery.—The early efforts to eradicate the disease was by removal of the cervix, either by cautery, knife or caustic; then followed removal of the entire uterus, as abdominal surgery developed, with nearly 100 per

cent of fatal recurrences. It was not until 1898 when Wertheim introduced his extensive radical removal of the uterus, adnexæ, broad ligaments and upper third of the vagina with enucleation of all pelvic glands that any definite improvement in results was obtained, but at a high cost of primary mortality and morbidity.

The difference between the ordinary panhysterectomy and the Wertheim operation may be best appreciated when likened to a simple mastectomy as compared to the modern radical removal of the breast with the pectoralis muscles, and the thorough cleaning out of the axilla of the lymphatic glands. A simple mastectomy for cancer of the breast would not be considered justifiable surgery today, yet I know that scores of women with cancer of the cervix are being subjected to an ordinary hysterectomy instead of the radical operation, due to the fact that the average general surgeon is not competent, owing to lack of experience and failure, to develop the necessary skill, or he fails to appreciate what the technic of the radical operation should be. I have seen Wertheim and many of the foremost exponents of his technic do the operation, and I have done many myself, and I speak knowingly when I state that I have seen operations that were called Wertheim's that in no way fulfilled the requirements of that technic.

One of the outstanding surgeons in this particular field today is Victor Bonney of London, and I would commend his recent Hunterian Lecture on the "Surgical Treatment of Carcinoma of the Cervix" to those who wish to obtain a proper appreciation of the technic and the difficulties of this formidable operation. The vaginal route was also popularized by Schauta for the wide removal of the uterus and attachments, made possible by the use of the extensive Schuchardt incision. In the first place we must appreciate that the Wertheim operation or the Schauta operation can only be employed in less than half of those applying for treatment, as it must necessarily be limited to the operable class, variable as this class may be in different hands. For the other half surgery offers nothing.

There is no difference of opinion as to what is the best treatment at our disposal for the inoperable class. Radiotherapy is admittedly our most valuable palliative measure, definitely prolonging life and in a small percentage of cases, approximately 12 per cent, accomplishing a cure.

Results with Surgery.—What can we hope to accomplish with the Wertheim operation in the most skilled and experienced hands in this less than 50 per cent of patients with cancer of the cervix that come to us?

Lane-Clayton's exhaustive study, published in 1927, of 80,000 cases in the literature, shows that about 37.6 per cent of five-year cures have been salvaged, but if all the patients applying for treatment are considered, the percentage is 18.3 per cent with a primary mortality of 17.3 per cent.

In the same year Heyman of Stockholm published a masterly study of the operative and radiologic statistics of the leading clinics of Europe and this country. He reduced the figures to a uniform standard. The operative results in twenty clinics showed a total cure rate of 18 per cent and an operable cure rate of 35.6 per cent, but with a primary mortality from the operation of 17.2 per cent.

Weibel in 1928 reports on 1,500 cases operated in Wertheim's Clinic out of 3,165 seen (47 per cent) with a five-year cure rate of 38.4 per cent on those operated, an absolute cure rate of 19.2 per cent on all cases seen, and an average primary mortality of 13.8 per cent.

Victor Bonney's recent report of his results shows that he had seen 450 cases and operated on 284 with a primary mortality of 16.5 per cent, a relative five-year cure rate of 37.8 per cent and an absolute cure rate of 24.4 per cent. His primary mortality in his last ninety-eight cases was 8.1 per cent.

Lane-Clayton states that the extended abdominal operation and radiation are the only methods in serious competition at present. Recently, however, Stoeckel, Adler, and others have been employing the Schauta vaginal hysterectomy combined with radiation, but up to the present time is too short for any comparative evaluation.

Treatment by Radiotherapy.—In 1929 was published the report of the Radiological Sub-Commission of the Cancer Commission of the League of Nations which gives the guiding principles, technic and results of radiotherapy in carcinoma of the uterus at the three great radiological clinics of Stockholm, Paris and Munich. Every surgeon who contemplates employing radiotherapy in the treatment of carcinoma of the uterus should be thoroughly familiar with

the contents of this publication of the League of Nations. It can be readily obtained, published in English, and while the technic employed in these clinics shows considerable variation, the principles of the physical and biological factors involved are in accord, and the results obtained are nearly the same. A perusal will quickly show the novice in radiotherapy that it is no simple matter to employ this two edged weapon efficiently and at the same time safely in the treatment of carcinoma of the uterus.

The technic of the application of the radium in these cases seems so simple that it is difficult to impress upon the casual observer that success and safety depends on the careful study of the location and extent of the disease, of the type of cell and the degree of its maturity, of the general physical state of the patient as to age, blood condition and toxemia, of the careful pre-operative preparation of the patient, of the amount of radium used and its distribution in appropriate containers, on the proper employment of screening to cut out the burning rays, on the placing and maintaining of the radium *in situ* where it will destroy the cancer and yet not damage adjacent viscera, on the duration of the application, and the time and dosage of re-radiations and deep X-ray therapy, and finally on a careful frequent follow-up. A personal experience in studying the action of radium on this disease over considerable periods of time is essential before one can become competent to properly treat cancer of the uterus with radiotherapy. I say this in spite of the assurances given the practitioner in the alluring advertisements in the medical press, that it is so simple that all he has to do is to send a description of the case and they will send the radium with full directions. Correspondence Courses in radiotherapy are dangerous and we wish to sound a warning as to the serious harm that may result from the indiscriminate application of radium by the inexperienced. I have seen a number of instances of grave permanent damage being done through the careless and ignorant use of radium by those not qualified. The renting of radium from commercial agencies is of course perfectly justifiable, but the knowledge and judgment as to how and when to use it can only be bought by careful study and personal experience and observation in radiological clinics. I cannot do better than quote Regaud's recent warning, "It

is necessary to have much experience to obtain from this method of treatment all the good that it may give without the evil that it may do."

The Action of Radium.—The effect produced by the action of radium upon malignant or normal cells should be familiar to all who use this element. Radium does not remove a cancerous growth by destruction of the entire part affected as is accomplished by surgery or cautery, but the gamma rays have a direct selective action on the cancer cells destroying them without injuring the normal cells at the site of the neoplasm. This is often demonstrated in healed cases of carcinoma of the cervix, where the normal shape of that organ may be restored with no trace of the site of the growth. Another action of radium is to cause the proliferation of connective tissue. The connective tissue, contracts with the resulting obliteration in great degree of the blood and lymph supply, producing the contracted, pale looking cervix and funnel shaped vaginal vault, that we see in the ideally healed cases.

Thus we must appreciate that if the dosage suitable for a certain case is used, we will destroy the cancer cells but *not* the normal tissues, owing to the selective action of the gamma rays on the carcinoma, and the greater resistance or toleration of the normal tissues. However, it must be born in mind that if we give much larger doses of radium than is required to destroy the cancer cells, we will also destroy the normal structures and produce extensive necrosis with its resulting septic absorption, hemorrhages, and injury of adjacent viscera with perhaps the formation of fistulæ. Remember also that these unfortunate results of over-radiation with this powerful element are commonly attributed to the extension of the carcinoma, or frequently the action of the radium is blamed and consequently condemned as of no value.

We must see also that if too small an amount of radium is used, or for too short a time, that we may fail to destroy all the cancerous tissue.

Upon the proper screening of the radium depends the elimination of the Beta, or burning rays, which cause extensive destruction of the normal tissue. Various metal containers of different thickness are used such as platinum, gold, silver, or brass for this purpose, and the integrity of the bladder and rectum is accomplished by "distance screening," that is pushing them out of reach of the rays by over distending the

vagina with gauze. If inadequate screening has been used, unnecessary necrosis will result.

Too frequently repeated radiations, especially if a heavy dosage for prolonged periods are employed, will result in the so called "late reaction" of radium. Six months, or a year or more, following the initial treatment dense infiltration, pelvic pain, ulceration and discharge may develop which is apt to be attributed to a *recurrence* of the disease, when actually it is the result of an over-irradiation of the tissues with resulting excess of connective tissue formation. This produces a slowly developing obliterating arteritis, and the devitalized structures ulcerate and become a ready prey to infection.

Considerable work has been done in this country in studying the type of cancer cell and the effect of the radium on the several varieties in the hope that a guide to the prognosis might be found. Broders, Martzloff, Greenough, Schmitz and others have made valuable contributions to this subject.

Two main histological types of cervical carcinoma are recognized, the epidermoid carcinoma and the adeno-carcinoma. The epidermoid carcinoma, which is much the most frequent, is divided into three classes according to the differentiation of the type of cell. The epidermoid group is the most common form, and the cell types are designated as the squamous or spindle cell, which is the most mature or "ripe" cell, the transitional or plexiform "midripe" cell, and the anaplastic spindle, "unripe" cell.

The adeno-carcinoma is chiefly recognized by its glandular form of growth.

The importance of recognizing these various types of cancer cell will be appreciated when we understand that they respond differently to irradiation. The "Law of Bergonie and Tribondeau" states that "Immature cells and cells in an active state of division are more sensitive to irradiation than are cells which have acquired their fixed adult morphologic and physiologic characters." The squamous spinal, or mature cell is much the more radio-resistant and at the same time is more slowly growing and the least malignant type, while the embryonic anaplastic "unripe" spindle cell is the least radio-resistant but the most rapidly growing and most malignant type. The transitional or "midripe" cell is midway between these two extremes in responding to irradiation. The adeno-carcinoma of the cervix is

fortunately much less frequent (our ratio is about 13 to 1), as it is very radio-resistant and more difficult to cure.

The ability to make a prognosis as to the probability of obtaining a cure by studying the type of cell is open to debate and is not uniformly accepted, as it is evident that many other factors must be taken into account, notably the extent of the disease and the physical resistance of the patient, and also that the ordinary biopsy does not allow of a study of the complete specimen which may show considerable variation in the type of cell differentiation in various regions.

From what has been said it must be evident that the ideal irradiation should be a dosage adjusted to the type of cell we are dealing with and to the extent of the disease, which, while sufficient to destroy all the carcinoma cells, yet should not damage the normal tissues beyond repair. Schmitz has attempted to standardize the dosage according to the cell type, giving a 100 per cent erythema skin dose with combined radium and X-ray for the embryonic unripe cell, and 150 to 175 per cent for the squamous adult cell. He states that the normal tissues will bear without permanent injury an erythema skin dose of 150-175 per cent. The 100 per cent dose may be represented by 3200 milligram hours of radium, 150 per cent by 4800 milligram hours, and 175 per cent by 5600 milligram hours, the latter being the utmost limit for normal tissues.

Large quantities of radium then are not of advantage for internal application. The curative penetration of the gamma rays is limited to about 3.5 centimeters in the amounts that we may safely use. Necrosis of tissue may be caused at the site of application by the gamma rays breaking up into secondary rays from the metallic screens and their action on striking the tissues. We attempt to limit the action of these secondary rays by aluminum or pure rubber protection. It does not avail us to attempt to secure a deeper penetration in an effort to reach the parametrium by greatly increasing the amount of radium in the container, because the intensity of radiation is decreased inversely in proportion to the square of the distance, and the result we would obtain would be a marked and unnecessary increase of the local damage without appreciable gain in penetration.

Toxemia.—The physical condition of the patient may have an important bearing on the reac-

tion produced by the radiotherapy. Many of these patients are anemic and cachectic, and suffering from toxemia as a result of the absorption of necrotic carcinomatous tissue. Frequently they are septic due to a local infection of the ulcerated areas. The immediate result of the radiotherapy in such cases is to produce a severe reaction on account of the absorption of the autolytic and toxic protein substances which have been liberated by the destruction of the cancer cells.

This "radiation sickness" is naturally more severe in those cases that are already toxic and anemic, and this systemic condition prevents the defense mechanism from promoting the prompt healing of tissues. The effect of the radium is to produce a leukopenia and the patient's resistance needs to be fortified to combat this condition. Hence the value of blood transfusions to enable the patient to weather the storm and make a smoother recovery.

External Radiation.—As the beneficial action of the gamma rays of radium is limited to a range of 3 to 4 cm., it is apparent that if the cancer has spread beyond this distance, that the local radium application will not be sufficient to eliminate the disease. Bonney found 43 per cent of gland involvement in his operative cases, and it is to this that he attributes the superiority of surgery.

External radiotherapy by means of the high voltage deep X-ray or by using a radium pack, or "bomb" at a distance, is necessary to attack the disease when beyond the reach of the internal radiation. The use of radium at a distance requires a large amount of radium, 2 to 4 grams, so that the method is not available except in a few radiological institutions.

According to Regaud the use of radium at a distance for external radiotherapy is more desirable than the deep roentgen rays as the short gamma rays of radium are undoubtedly more selective in their action than X-rays. He states that if normal tissue and cancer tissue are exposed equally to radium and the X-rays, it will be seen that while there is an equal destruction of the cancer cells, there is less change observable in the normal connective tissues with radium than the X-ray.

Nearly all radiologists are agreed that the combined treatment is necessary to obtain the greatest benefit, although the results secured in

the Stockholm Clinic and our own clinic have been accomplished largely without the X-ray, until recently. Heyman has just published a report of the Stockholm results with the combined treatment which shows a definite improvement over their previous experience, and he states that this technic now will be their routine method. At the Woman's Hospital, we did not have the high voltage apparatus until the past two years, and we are at present using the combined method in the advanced cases.

The Limitations of Radiotherapy.—To find the balance between the dosage necessary to completely destroy the neoplastic cells, and at the same time keep within the minimum dosage which will destroy normal tissues, is the problem that the radiologist must meet. It is obvious that the conditions in each case may vary greatly. The type of cell, the physical characteristics of the growth, the size and condition of the organs affected and the constitutional state of the patient are all factors which must be carefully weighed in planning the dosage and technic best suited for the case under consideration.

Regaud has pointed out that radium is not a cure for every case of cancer. It is with the epidermoid type that the best results have been obtained. The adeno-carcinoma group are more difficult to cure. In the cases where the parametria are involved, the proportion of five-year cures is small, although the palliative results, even in many advanced cases, are of great value in prolonging life and reducing suffering.

Healy states that they have found that 80 to 85 per cent of all their carcinoma of the cervix cases were in the advanced stage.

Results with Radiotherapy.—What can we hope to accomplish in treating carcinoma of the cervix with radiotherapy?

When we speak of a "cure" we must understand we mean that the patient is clinically free of cancer not less than five years after commencing the treatment. In the report of the Sub-Commission of the League of Nations in 1929, Heyman shows that at the Radium-Hemmet, Stockholm, they had treated 737 cases of carcinoma of the cervix with an absolute cure rate of 20.6 per cent and a primary mortality of 2.1 per cent, and a relative cure rate of 23.1 per cent. Twenty-five and one-half per cent of these cases were classed as operable with a cure rate

of 40.4 per cent, and 66.7 per cent were inoperable with a cure rate of 13 per cent.

Lacassagne reports for the Radium Institute of Paris on 350 patients treated by radiotherapy alone with an average cure rate of 20 per cent. Forty-two per cent were cured where the disease was limited to the cervix, and 10 per cent in the advanced cases. Regaud in an address given in November, 1929, shows that while their average cure rate for their total cases was 20 per cent, that there has been a steady improvement in their salvage each year from 10 per cent in the 1919 series to 30 per cent in the 1923 series, and the indications as shown by their provisional results point to a still higher percentage of cures in subsequent series.

Voltz reports for the Munich Clinic that 1319 patients were treated from 1913 to 1923 inclusive, with an operability rate of 17.2 per cent. The absolute cure rate for these cases was 15.4 per cent. For the cases with the disease limited to the cervix the cure rate was 40.5 per cent, while for the inoperable group the salvage was 10.7 per cent. Voltz shows that since 1920, when the combined internal and external radiation has been in use, that there was a definite improvement in results by combining radium with X-rays, and in their fully treated cases their absolute cure rate by their recent technic is 21.4 per cent.

The Memorial Hospital in New York results as reported by Healy in 1928 shows 50 per cent five-year cures in the early cases and a 25 per cent relative cure rate. Bowing and Fricke in a recent report from the Mayo Clinic show that of 626 cases treated by radiotherapy only, they had an absolute cure rate of 21.08 per cent, and a relative rate of 23.15 per cent, while with the operable group the absolute rate was 60.86 per cent.

It is also interesting to note that Wintz has reported 17.1 per cent five-year cures by deep X-ray alone in 415 cases, and Adler states by the combined vaginal operation with radium and X-ray that he has a cure rate of 32 per cent in 256 cases with a primary mortality of 3.6 per cent.

At the Woman's Hospital, New York, we have been treating carcinoma of the cervix with radium since February, 1919. In October, 1930, we presented our results for the period from 1919 to 1924 inclusive at the meeting of the

American College of Surgeons. During this period we have seen 259 cases; eight of these were refused radium treatment because of a hopeless condition, and 251 patients were treated with radium. Of these 251 cases the disease was limited to the cervix in 65 (Class I and II, Schmitz), an operability rate of 25.9 per cent. In 186, the disease had extended beyond the cervix (Class III and IV, Schmitz), an inoperability rate of 74.1 per cent.

The ages of the patients ranged from twenty-four to seventy-six years. There were 15 patients under thirty years of age.

Our primary mortality in 361 radium applications was four deaths or 1.1 per 100 applications. There were no deaths in the Class I and II cases.

The five-year end-results of these cases were sixty-four living patients, giving an absolute cure rate of 24.7 per cent and a relative cure rate of 25.5 per cent.

Of the 251 cases, 170 were treated only by the technic we have developed. In this group 79.4 per cent were suffering from an advanced type of the disease (Class III and IV).

Forty-four of these 170 patients of all classes of the disease were living at the end of the five-year period, or 25.9 per cent; of the Class I and II cases (limited to the cervix) of which there were 25, 20 were living or 57.1 per cent; of the 135 Class III and IV cases (advanced beyond the cervix), twenty-four were living, or 17.7 per cent.

In 251 cases treated we were able to trace all but nine, or a completed follow-up of 96.4 per cent. The lost cases were classed as dead of cancer.

ESSENTIALS OF THE WOMAN'S HOSPITAL METHOD

During the first year our technic was not systematized and was therefore variable and was sometimes combined with surgery, but since 1920, we have consistently followed a technic that we have developed. This technic we have previously published in detail, the essential features being: the preliminary building up of the patient's resistance when indicated; an initial test dosage of radium of 2,400 to 4,200 milligram hours is given and we watch the result, subsequent irradiations being dependent on the reaction; a meticulous postradiation care of the patient, with a personal monthly follow-up throughout the entire five-year period, with re-radiations

whenever the follow-up examinations disclose evidences of beginning recurrence that are within reach. We have not used the high voltage X-ray therapy as an adjunct until the past two years, so this factor does not enter into the six series reported.

Our experience has led us to believe that improving the patient's resistance before the irradiation in cachectic cases is of distinct advantage in enabling the patient to pass through the period of post-radium reaction safely. Therefore whenever possible every patient with red cells less than 3,500,000 and hemoglobin 50 per cent or below, is given a blood transfusion prior to the application of radium.

We have found that spinal anesthesia, a half dose only being necessary, is more desirable than a general anesthetic in these cachectic cases when inserting the radium. Potassium permanganate douches and an elevated posture are begun at once to favor drainage and separation of any post-radiation slough.

The value of a personal follow-up each month we believe cannot be overestimated. In no other way is it possible to detect early recurrences as manifested by small nodules or erosions long before the patient is aware of any subjective symptoms. Thus we are enabled to give a re-irradiation with tube or needle in time to check the recurrence while in its incipency.

Re-Irradiations.—The outstanding feature of our method of treatment is this re-irradiation whenever our monthly follow-up inspection reveals evidence of recurrence in the vaginal tract, during the entire period of five-year observation. Nearly 50 per cent of our cases have had repeated irradiations. This is of interest because repeated applications of radium after the initial treatments, are not the usual practice in radium clinics, due to the fear of producing late radium necrosis as a result of the radio resistance of the tissues being increased by over-irradiation. This danger in our belief occurs only if prolonged and repeated applications of a heavy dosage are used. This we try to avoid. Our employment of re-irradiations after the initial treatment is largely for metastatic outbreaks in the vaginal walls or fornices, and consists of a relatively small dosage usually in the form of platinum needles, although should the nature of the recurrence make the use of a contact application more desirable we do not hesitate to use tubes or

flat containers. The average dose ranges from 300 to 1,200 milligram hours, depending on the size and location of the metastases. Very few clinics have such a frequent follow-up continued throughout the five years, and it is to this that we attribute our success in saving some cases by discovering recurrences early. We have many instances of successful irradiation of such metastases, occurring two, three, and four years, or longer after the initial treatment, our cure rate for these cases being 26.5 per cent.

We are encouraged to continue this practice in spite of some criticism, as our results seem to justify it, and as several authorities have recently reported the use of this procedure. Heyman in an address before the Royal Society of Medicine in 1929 states that, "We have in recent years in cases of persistent small residua and in the cases of smaller vaginal recurrences made use of intubation of radium needles." The Marie Curie Hospital of London reports that they give repeated irradiations in certain cases with improvement. Taussig in a discussion before the American Gynecological Society last year spoke of the value of re-irradiation, stating that they had caught recurrences in a very early stage and have been able to save and prolong life thereby. In this connection it is interesting to note that in the Munich Clinic the standard treatment is to give a second irradiation eight weeks after the first and if the follow-up shows it necessary a further treatment after an eight weeks interval. Voltz states that no case of theirs survived that did not receive the second treatment two months after the first.

We wish to emphasize the danger of re-irradiating cases with a late radium reaction, under the mistaken impression that there is a recurrence of the carcinoma.

SURGERY VERSUS RADIUM IN CARCINOMA OF THE CERVIX

While exceptional operators like Bonney may attain a slightly higher rate, the highest average figure for the Wertheim Operation in experienced hands is about 20 per cent absolute cure rate. The average absolute cure rate for radiotherapy as reported by the radiological clinics fully equals this. The 50 per cent that apply which cannot be operated upon because of the extent of the disease, have nothing to hope from surgery. From radiotherapy they may look

for a 12 per cent cure and definite palliation with prolongation of life in most cases.

Lane-Clayton's study shows that the primary mortality of the radical operation averaged 17.3 per cent for all cases and the more advanced the disease the higher the rate, contrasted with a primary mortality rate of less than 2 per cent for radium, and that on the basis which includes all cases applying for treatment the results obtained with radiotherapy show a somewhat higher proportion of successes than are obtained with surgery.

While the question of radium versus surgery in the operable cases is still debatable, it must be granted that radiotherapy has a strong position in view of the results that have been accomplished by this method. A 57.1 per cent salvage in early cases with no primary mortality, which we have obtained, compares favorably with Bonney's recent report of 38.7 per cent and a primary mortality of 8 to 16.5 per cent with the Wertheim operation, admitting that he operates on many cases where the disease has extended beyond the cervix, and our absolute cure rate of 24.7 per cent is about equal to the 24.4 per cent which he reports.

Regaud in his address given at Liverpool controverts Bonney's claim of the superiority of surgery when it is a question of the invasion of lymph glands, and states that their statistical results justify this claim. By the association of roentgentherapy with the internal use of radium in advanced cases he believes that percentages of lasting cure have been obtained which surgery cannot equal.

Surgery has reached its zenith in the hands of experts after years of experience, and we cannot hope for much further improvement in their results. Radiotherapy on the other hand is as yet in its infancy and we can look forward with confidence to a continued improvement in results as our experience and technic develop.

In summarizing the case of surgery versus radium for carcinoma of the cervix, we may say that while there are differences of opinion as to which method gives the best results in those cases that are in the operable class, there can be no dispute as to the more than 50 per cent of inoperables. For these cases radiotherapy is our most valuable agent today with its undoubted palliative worth and a cure rate of more than 12 per cent. As to what cases are to be classed as "operable"

will always be debatable, as the personal equation must enter into the problem. Consequently the comparison of statistical reports from different clinics must be of uncertain value in estimating the results of treatment in this group. Only the final end results of the total cases seen can be accurately appraised.

CANCER OF THE FUNDUS

About 10 per cent of cancer of the uterus originates in the fundus and is usually of the adeno-carcinomatous type of cell. It is more frequent after the menopause, the mean age incidence being about eight years higher than the cervix cases. It is generally agreed that the ordinary pan-hysterectomy gives such a satisfactory cure rate that it is the method of choice. Lane-Clayton states that the operability is about 80 per cent, and the five-year survival rate is about 60 per cent. However, many of these patients are poor operative risks due to old age, obesity, cardio-vascular disease, deficient renal function, or diabetes. These complications were present in over 50 per cent of our cases.

Radiotherapy must then be relied upon. The Stockholm Clinic report 43.5 per cent cure rate with radium alone in forty-six cases. Healy and Cutler report 58.5 per cent cures in eighty-two cases with radium at the Memorial Hospital, New York. We believe that the ideal method is to combine radium with surgery in these cases wherever possible.

CONCLUSIONS

Progress in the conquest of cancer of the uterus depends not only on advances in technic and therapy, but upon earlier diagnosis. The earlier the case is treated the greater the chance of a cure and with less danger. At present 80 to 85 per cent of patients applying are in the advanced stage. We must look to the general practitioner to make these early diagnoses and to educate his clientele to the importance of promptly seeking advice for suspicious symptoms.

It is just as necessary that men should be properly trained in the treatment of cancer of the uterus by radiotherapy if satisfactory results are to be obtained, as that they should be properly trained in surgery.

SUMMARY

1. I believe that the best statistical reports

show that radiotherapy is preferable in all classes of carcinoma of the cervix, although I believe that the radical operation will give as good results as radium in the early cases, but at the high cost of primary mortality and morbidity.

2. There is less primary mortality, less morbidity, less loss of time with radiotherapy than with the radical operation for carcinoma of the cervix.

3. The morbidity results of the radical operation should not be forgotten.

4. Radiotherapy in the advanced cases has no rival with a 12 per cent salvage and as a palliative measure.

5. Re-irradiations, when properly employed, are of definite value in curing local metastases throughout the five-year period of observation.

6. A frequent personal follow-up throughout the five-year period is necessary in order to make possible the early discovery of local recurrences, and to permit of prompt re-irradiations.

7. Carcinoma of the fundus is best treated by the combined use of radium and surgery whenever possible.

8. The early treatment of cervical injuries and disease is an important prophylactic measure.

9. The upward trend in the death rate from cancer calls for a compulsory registration of all cases.

10. It is to be deplored that many women with cancer of the cervix are hopelessly doomed, because they are submitted to obviously useless and obsolete surgical procedures, or have been improperly treated with radiotherapy.

11. Finally, I wish to emphasize that if surgery is used for carcinoma of the cervix, only the radical Wertheim operation is justifiable and that this requires experience with a highly specialized technic. If radium is used, experience and a thorough understanding of the action of this powerful agent and a full appreciation of the complexities of its safe and efficient application is essential, otherwise we assume a grave responsibility in not giving these patients a chance for their lives.

"A little learning is a dangerous thing,
Drink deep, or taste not the Pierian spring."

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RECENT DEVELOPMENTS IN THE TREATMENT OF DUODENAL ULCER*

DONALD C. BALFOUR, M.D.
Rochester, Minnesota

SURGERY occupies an undisputed place in the treatment of chronic duodenal ulcer. Although it is often difficult to determine the best plan of treatment in certain stages of the disease, in many cases the disease has progressed to a stage at which there is no question but that well applied surgery offers more to the patient from every standpoint than does any other method of treatment. Long-continued disability; intractability to treatment; acute, subacute and chronic perforation; obstruction; recurring hemorrhage, and severity of symptoms, are all clear indications for operation. When this is properly carried out, it will, in a high percentage of cases, give complete and permanent control of the disease, its symptoms, and its complications.

The present practice of postponing operation until such conditions as those named have developed is sound in that there can be no doubt as to the wisdom of operation under such circumstances. I believe that further experience will show that surgical measures can be applied in earlier stages of duodenal ulcer, to the benefit of the patient, particularly in relief of symptoms and protection against the complications of the disease. Frequently the disease has been of long duration, and extensive induration and deformity of the duodenum has taken place. Therefore, gastro-enterostomy is most often the operation of choice because its rates of mortality and morbidity are low, and because it can be relied on to give excellent results when employed in such cases.

Gastro-enterostomy, however, even in cases of long standing, is not always the best operation. It is because of the possibility of earlier operation being advantageous, and because of certain other indications for direct procedures for lesions of the duodenum, that I wish to consider the place which these direct procedures hold in the treatment of duodenal ulcer. The term direct procedure is applied to an operation which

includes removal of the lesion or lesions in the duodenum and reconstruction of the pyloric outlet.

There are certain inherent advantages in direct operations for duodenal ulcer, which should always be kept in mind. First, when direct operation is done in cases which are carefully selected, it will be associated with a lower mortality rate than that of any other operation for duodenal ulcer. This statement, although true, is misleading, since gastro-enterostomy is chosen in those cases in which operation is of increased risk, because of the poor condition of the patient, marked obstruction, the presence of extensive inflammatory products, and so forth. Gastro-enterostomy is then a safer procedure than any method of excision and pyloric reconstruction. It would, therefore, be more accurate to say that direct operations are of least risk when they are used in cases in which they can be done safely. Second, the possible advantages of removal of the lesion or lesions must be considered. Theoretically, these are advantages, but in actual fact they cannot be very definite except in those cases in which the ulcer has been associated with bleeding. I am aware of the theory propounded by exponents of partial gastrectomy that an unremoved duodenal ulcer may act as a focus and be responsible for formation of a new ulcer. This possibility must be slight since the most certain result of well performed gastro-enterostomy for chronic duodenal ulcer is permanent healing of the ulcer. Any real value in removal of whatever lesions are present in the duodenum is chiefly confined to the hemorrhagic type of ulcer. Third, direct operation for duodenal ulcer usually permits inspection of the posterior wall, and the information thus acquired as to the extent of the disease is of unquestioned value in the intelligent management of the case. Fourth, in the event of recurrence of ulceration after direct operation with reconstruction of the pyloric outlet, further surgical treatment is not difficult.

The first indication for direct operation for

*Read before the Minnesota State Medical Association, Minneapolis, May 5, 1931.

duodenal ulcer, then, is that it can be safely and satisfactorily done. Decision as to the advisability of attempting excision of the lesion varies with the experience of the surgeon; the greater his experience, the larger the number of lesions he will find removable. Primarily, a satisfactory direct operation depends on the situation, size and number of the lesions, the type of perforation, the accessibility of the duodenum, and the amount of scarring which has taken place in the walls of the duodenum. Direct operation, therefore, is usually contraindicated in those cases in which multiple lesions are so situated that they can be removed only with great technical difficulty and consequently increased risk. When a lesion of the posterior wall is large and has perforated deeply into the head of the pancreas, when great deformity of the duodenum exists, when diffuse scarring has narrowed and shortened the first part of the duodenum, when extensive involvement of periduodenal tissues, or gallbladder, or liver, has occurred, or when marked obstruction is present, any attempt at direct operation is usually contraindicated.

The type of case in which the direct operation is most commonly employed is in the young patient with a nonobstructing ulcer or inflammatory process of the anterior wall, with marked hyperacidity, and a small, high-lying, hypertonic stomach. In such cases, although gastro-enterostomy will usually give a good result, the danger of recurrence of a lesion in or near the stoma is unquestionably greater in other types of cases. On this score, excision of the lesion and reconstruction of the pyloric outlet have obvious advantages, and they should be done when any operation appears indicated in such cases, even though technically they are difficult. A most important feature of these early cases is that the only visible evidence of pathologic change in the duodenum is an inflammatory process of varying extent, without any true ulceration of the mucosa. Judd has emphasized this condition of duodenitis and the value of wide removal of the inflammatory portion. It is also common to find after removal of these nonulcerating lesions of the anterior wall other lesions, or a lesion in one stage or another, on the posterior wall. This multiplicity of lesions presents a problem which I shall consider later.

Direct operation must always be considered in those cases in which hemorrhage has been an as-

sociated symptom. There is no doubt that greater protection against subsequent hemorrhage is afforded the patient if lesions are removed than if they are not removed. This fact often gives rise to an interesting surgical problem, when, because of multiplicity of lesions, or the situation or extent of a lesion, removal becomes an operation of obviously increased risk. I am convinced that when such added risk is real, it is better to perform gastro-enterostomy, with a risk of less than 1 per cent, and with good prospects of satisfactory healing of the ulcer, than to attempt excision. In those cases of hemorrhagic ulcer in which direct operation can be carried out without prohibitive risk, the advantages of visualization of the posterior wall are very important, since it is usually a lesion of the posterior wall which is responsible for serious or fatal hemorrhages. I shall refer to the treatment of such lesions later.

Acutely perforated duodenal ulcers are occasionally best dealt with by direct operation. Simple closure of a perforation, done within the first six hours after the perforation has occurred, practically always saves the life of the patient, but many of these patients will have recurrence of symptoms sufficiently severe to demand subsequent operation. Gastro-enterostomy at the time of the closure often adds unnecessary risk to the operation. Excision of the perforated ulcer with the surrounding inflammatory duodenal wall, and reconstruction of the pyloric outlet can be done, I am convinced, in many cases, without increased risk and with excellent prospects of permanent protection against recurrence. I recently operated on a patient twelve hours after perforation of a duodenal ulcer which had produced almost complete obstruction. The entire inflammatory region could be readily excised, and the pyloric outlet reconstructed so as to provide a large lumen, with complete relief of the obstruction.

The direct operation for duodenal ulcer is particularly well applied in the treatment of gastrojejunal ulceration. The primary requisite in operation for gastrojejunal ulceration is removal of the lesion and disconnection of the gastro-enteric stoma. It is also necessary, however, to consider what is best to control the activities of the duodenal ulcer for which the gastro-enterostomy was done. Usually the primary lesion has completely healed, and it is occasionally advisable to do

nothing for it, but a regimen for the patient to live by should be established and, should reactivation of the primary lesion take place, some surgical procedure should be carried out later. In many cases it is possible to prevent reactivation of the disease by a reasonable regimen. It is usually preferable, however, at the time the gastrojejunal ulceration is dealt with, to carry out some procedure for the primary duodenal ulcer, particularly if it is of the contracting type. Excision of the ulcer, with reconstruction of the outlet, possesses great advantage under such circumstances. First, the operation adds little to the risk, and, second, it avoids the serious problem of recurrent ulceration following partial gastrectomy. In the few cases in which gastrojejunal ulceration develops following well indicated and well performed gastro-enterostomy, the patients demonstrate unusual liability to the development of ulcer; this fact should be constantly kept in mind in selecting the type of operation for the duodenal ulcer. It is for this reason, also, that excision and reconstruction of the pyloric outlet has such signal advantage, for should recurrence of ulcer follow, great flexibility in surgical treatment is possible; this is in contrast to the difficulties and restrictions of treatment of the recurrent ulcer in the resected stomach.

The methods of accomplishing direct operations for duodenal ulcer are numerous. Finney gave great impetus to such operations with his pyloroplasty. Many modifications of this have been made with the purpose of meeting the various conditions found. In principle these procedures are the same, and they provide for removal of the lesion, ablation of the pyloric outlet, and reconstruction of the outlet so that an adequate lumen will be permanently established.

Wide removal of the anterior portion of the pyloric muscle and the cap of the duodenum, as emphasized by Judd, adds definitely to the prospect of building up a satisfactory outlet. The preliminary steps in the operation are most important, since satisfactory mobilization of duodenum and pylorus has much to do with completing the operation safely. Sutures placed through the pyloric muscle, at the lesser and greater curvatures, serve as excellent tractors and as means of controlling bleeding when the muscle is severed. A very useful procedure is first to open the stomach midway between the curvatures, and about 2.5 cm. above the pylorus, introduce the finger, and examine the posterior wall of the duodenum. Occasionally a lesion of the posterior wall may be found to be so situated, and of such a size, that excision seems unwarranted; gastro-enterostomy thereby becomes the operation of choice. The opening in the stomach can then be closed, and the gastro-enterostomy performed. If it is advisable to proceed with local excision, the finger may be used as a guide, and the pyloric muscle divided just to the inner side of the stay sutures; then the anterior wall is inspected and if a lesion is found, as is common, it is excised with the cautery and the defect closed with two rows of continuous chromic catgut, the suture beginning and ending in the stump of the pyloric muscle. Interrupted sutures of chromic gut reinforce the suture line. The pyloric end of the stomach is then sutured to the round ligament of the liver, as recommended by W. J. Mayo. The risk of this procedure is less than 1 per cent and the results in relieving the patient of symptoms, protection against recurrence of ulceration, and its complications, give it a fixed place in the surgical treatment of chronic duodenal ulcer.

PHLEGMONOUS ENTERITIS

E. MENDELSSOHN JONES, M.D., F.A.C.S.
Saint Paul

A PHLEGMONOUS affection of the gastrointestinal tract carries a very high mortality and fortunately is not commonly encountered. In 1906, MacCallum found that only seven cases had been described. Five of these involved the upper part of the small intestine, one the colon and another the whole digestive tract. Since this report the majority of the other recorded cases substantiate the fact that the lesion is most common in the small intestine and particularly the duodenum and upper jejunum.

Phlegmonous enteritis is similar pathologically to phlegmonous gastritis and phlegmonous colitis. It may occur as a secondary manifestation in connection with such conditions as a strangulated hernia or intussusception where mechanical interference with the bowel or its circulation has taken place. All of the cases cited by MacCallum ended fatally. Hughes and Zoepffel each report one case of phlegmonous enteritis with recovery after resection. In phlegmonous inflammation of the large intestine Dowd has a recovery after resection of the diseased bowel. Wilson reports a case of phlegmon of the jejunum with recovery following a lateral anastomosis between the jejunum above and below the lesion.

Primary phlegmonous enteritis is exceedingly rare but the secondary type is more common. It occurs more frequently in the male sex and has been observed between the ages of six and seventy-five. In all cases the existing cause is a pyogenic organism and usually of the streptococcal type.

In discussing phlegmonous duodenitis Black points out that individuals suffering from severe burns and septicemias do, in rare cases, develop ulceration of the duodenum. After artificial production of septicemia in animals, congestion of the duodenum is generally found. These facts and experiments would suggest that a substance has entered the blood, been excreted by the bile and on entering the duodenum has combined with or been split up by certain of the duodenal

contents to form an intense irritant poison which has attacked the walls of the duodenum, setting up a violent inflammation.

Arkanzy suggests that traumatism to the abdomen may injure the mucosa of the upper part of the intestine more readily because of its relatively fixed position and thus afford a point of entrance for infection. MacCallum points out that due to the relative freedom from bacteria in the uppermost part of the intestine there might be a point of lowered resistance produced by the trauma and the streptococcus carried to it by the blood stream.

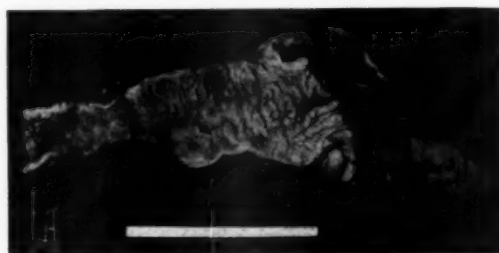


Fig. 1. Specimen of ileum removed at autopsy showing marked thickening.

Zoepffel considers that elderly men are prone to the disease by reason of diminished hydrochloric acid content of the gastric juice, which is therefore less bactericidal and allows injurious bacteria to reach the upper intestine.

Taylor and Lakin report a case of phlegmonous inflammation of the duodenum following the impaction of a fish bone. Fish bones, in their passage along the gastro-intestinal tract, may be arrested at any point and by perforating the mucosa carry infection to the deeper coats of the bowel.

The affected portion of the bowel shows marked thickening and stands out like a rigid tube. It has a velvety appearance and usually is a dark reddish color. There is often enlargement of the regional lymph nodes. There may be patches of fibrinous exudate on the peritoneal coat of the intestine. On section the mucous

membrane is seen to be roughened and granular in character with irregular hemorrhagic areas. The submucous and muscularis coats also show considerable swelling, due to the purulent infiltration.

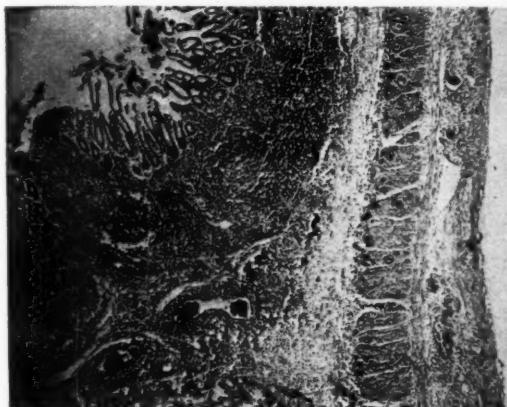


Fig. 2. Microscopic section of the wall of diseased ileum. Note the very decided thickening in the submucosa.

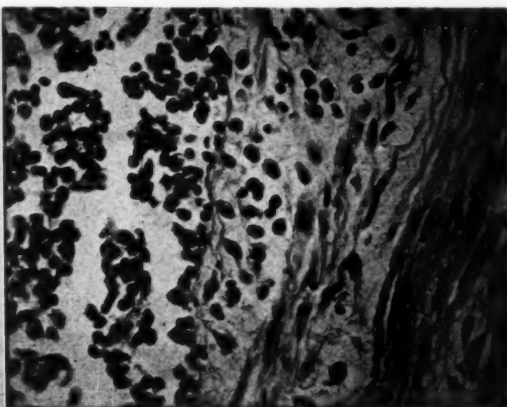


Fig. 3. Higher power section of the submucosa showing infiltration with lymphocytes, plasma cells and polymorphonuclear leukocytes.

The onset of the disease is characterized by cramplike abdominal pain which the patient often has difficulty in localizing. Nausea, vomiting, or both, may be present. The temperature is not usually high, and the pulse rate will vary with the severity of the case. As a rule there is an increased leukocyte count. Abdominal examination may show a slight distention, with tenderness and rigidity. These findings will naturally be dependent on the stage of the disease in which the patient is seen and the location of the lesion.

In considering the question of diagnosis I do not believe one could often form a more definite opinion than that he is dealing with an acute abdominal disorder that calls for immediate surgical intervention. Operation offers the only method of treatment that will benefit these patients. The operation of choice seems to be resection of the affected bowel with anastomosis to restore its continuity. This cannot always be carried out when the lesion is situated in the duodenum or upper jejunum. The prognosis is very poor and this can be improved only by early operation and recognition of the disease.

The first case I wish to present arose as a complication of scarlet fever and would be classed as secondary phlegmonous enteritis.

Case I.—A five year old girl was admitted to the

hospital on January 25, 1930, with a typical case of scarlet fever. Her temperature was 101, pulse 120, no complications. On examination it was noted that the abdomen was normal. Nothing unusual occurred until the night of January 30, when she complained of abdominal pain localizing in the umbilical region. This

was followed by vomiting and a complaint of pain in the lower right quadrant of the abdomen. The next day she had four watery stools and developed extreme tenderness in the lower right abdomen. The leukocyte count was 45,000, temperature 101.6, and pulse 120. The urine was normal. X-ray of the chest was negative. Rectal examination revealed tenderness on the right side. I first saw the patient on the evening of January 31, and after examination made a diagnosis of acute appendicitis and advised immediate operation.

The abdomen was opened through a lower right rectus incision. The peritoneal cavity contained a small amount of turbid fluid. There was no odor. The appendix, cecum and terminal ileum were loosely adherent to one another by a yellowish fibrinous exudate. The serosa of the appendix, cecum and terminal ileum was very red, but I was struck by the thick tube-like character of the ileum for a distance of about 15 centimeters from the ileocecal valve. The mesenteric lymph nodes were markedly enlarged. I removed the appendix and closed the abdomen without drainage. The patient died February 2, from a general peritonitis.

At autopsy the intestines were dilated and covered with a fibrinous exudate, there being 200 c.c. of a thick, purulent material in the abdominal cavity. The gastro-intestinal tract was normal except in the region of the cecum. The terminal 15 centimeters of the ileum was markedly edematous, its wall being very much thickened and the mucosal surface roughened and granular in character with irregular hemorrhagic areas. This process ended abruptly at the ileocecal valve. The cecum and ascending colon showed con-

gestion of the mucosa. The ileocecal group of glands were enlarged, measuring 1.5 to 3.5 centimeters in diameter. They were hard in consistency. The peritoneal surfaces were covered in places by fibrinous exudate, and the peritoneal surface over one of the glands showed a necrotic area which might have been the

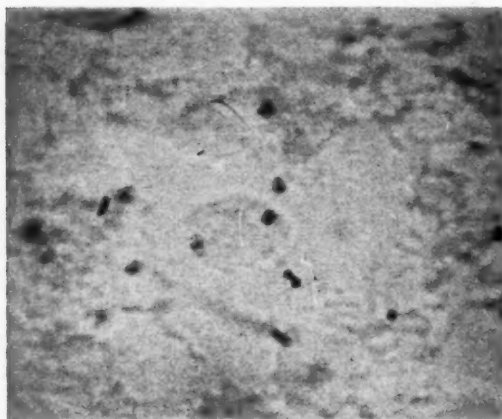


Fig. 4. Shows Gram-positive diplococci in the wall of the intestine.

source of the peritonitis. There were a few ulcers of the Peyer's patches in the ileum above the diseased area.

Microscopic section of the small intestine through the lesion revealed the wall to be markedly thickened. The surface layer of epithelium was absent and there was superficial ulceration of the mucosa. The glands were for the most part intact. The muscularis mucosa was destroyed in some areas by an acute and chronic inflammatory process and the submucosa decidedly thickened and infiltrated with polymorphonuclear leukocytes, lymphocytes and plasma cells. The muscularis and serosa were also diffusely and densely infiltrated with these cells. There was edema of all of the layers of the intestine but this was most pronounced in the submucosa, the phlegmonous inflammatory process being most marked in the submucosa and serosa. The thickness of these two layers was responsible to a large degree for the thickness of the intestine. The diffuse distribution of the inflammatory process and the absence of ulceration were characteristic of a phlegmonous inflammation. Gram stain of the lesion showed Gram-positive diplococci scattered throughout the wall. These were most numerous in the subepithelial tissue. In some areas the arrangement of the organism suggested short chains and it was thought that the etiologic organism in this case was the streptococcus.

Thinking the appendix might be playing a part in the process, I removed it, but of course this was unnecessary.

Looking back on this case and conceding the indication for a resection of the affected bowel, I do not believe it would have been feasible in

the presence of the existing peritonitis. The next choice would have been an anastomosis between the ileum above the lesion and the ascending colon, but I am convinced that in this case the best choice would have been to have performed an

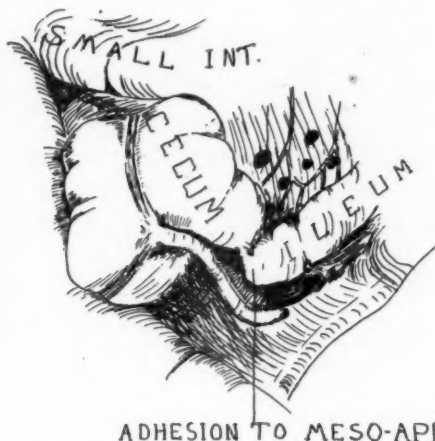


Fig. 5. Drawing showing partial obstruction of ileum and enlarged mesenteric lymph nodes.

enterostomy proximal to the lesion. This would have diverted the fecal current as well as a lateral anastomosis and is a much simpler procedure. If the patient survives the acute infection the bowel will undoubtedly heal and resection will not be necessary. The healing of such a lesion without resection is brought out in the following case.

Case 2.—Mr. N., a male aged 35, came to my office on December 20, 1930, complaining of pains in the lower abdomen. He stated that he was perfectly well until December 17, 1930. At this time he had some difficulty holding his urine. This was followed by intermittent abdominal pains which began in the lower right quadrant. The night before coming to the office he had a temperature of 101. The only thing of note in his past history was a complaint of lower abdominal distress occasionally after meals.

General examination was negative except for some slight tenderness and rigidity over the lower right quadrant of the abdomen. The urine was normal. The leukocyte count was 9,000; temperature normal. I told him I was not able to make a definite diagnosis but felt that he might have appendicitis. He was told to go home and remain quiet but to notify me if he had a recurrence of his pain. About 9 p. m. that night I was called to see him and he was again having cramplike abdominal pains. His temperature was 99.4°. Abdominal findings were the same as at the first examination.

I made a diagnosis of appendicitis and advised an operation. He finally entered the hospital the next eve-

ning. At this time his leukocytes were 15,000, pulse 80, temperature 99.

The next morning the abdomen was opened under spinal anesthesia. A right rectus incision was made. There was no excess fluid in the peritoneal cavity. The appendix was delivered and it did not appear acutely inflamed but a small knuckle of ileum was drawn into the wound with the appendix. There was a partial obstruction of the ileum due to its being adherent to the meso-appendix. The ileum for a distance of 10 to 12 centimeters was thickened, dark wine-red in color, with a glossy appearance to its serosa and had the tube-like characteristic of a bowel affected with a phlegmonous inflammation. The mesenteric lymph nodes were enlarged.

I relieved the ileum, removed the appendix and closed the abdomen without drainage. The pathological report on the appendix was negative. The patient made an uneventful recovery and states that since the operation his bowels are much more regular and that the occasional abdominal distress after eating has entirely disappeared.

This case also falls into the group of secondary phlegmonous enteritis as I believe his trouble was secondary to the partial intestinal obstruction which was found. Because of encountering the condition early in this case and also because of the presence of this very obvious intestinal obstruction I felt that by relieving the obstruction the exciting cause would be removed and the infection would subside. This is probably rather conservative treatment in the face of the bad results reported in the handling of this disease but I am sure there are different degrees of infection here as well as in other parts of the body and I believe we cannot say that any one method of treatment should be used in all cases.

In summarizing the facts gained from the study of this disease I wish to emphasize the comparative rarity of the condition and also the high mortality accompanying it. I believe a correct preoperative diagnosis of phlegmonous enteritis is very difficult but the recognition of an acute abdominal condition requiring immediate surgical intervention is of utmost importance. Resection of the affected bowel, when feasible, is recognized as the procedure of choice. When this is not possible anastomosis has been done between loops of bowel above and below the diseased area. In the very sick cases I believe simple enterostomy, if possible, proximal to the lesion should be the best method of treatment.

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FRACTURES OF THE HIP*

A. R. COLVIN, M.D.
Saint Paul

IN 1902 Whitman published a paper entitled, "A New Method of Treating Fractures of the Neck of the Femur." This method, now generally known as the abduction method, and also known as Whitman's method, is now recognized both in this country and in Europe as the standard method of treatment of these fractures.

The treatment of fractures in general consists

ment better results are obtained than by any other method of non-operative measures.

Perhaps by singling out certain items of experience a better understanding may be had why success and failure occur in a certain percentage of cases.

It is well at the outset to establish very clearly the types of fractures in this region. While there

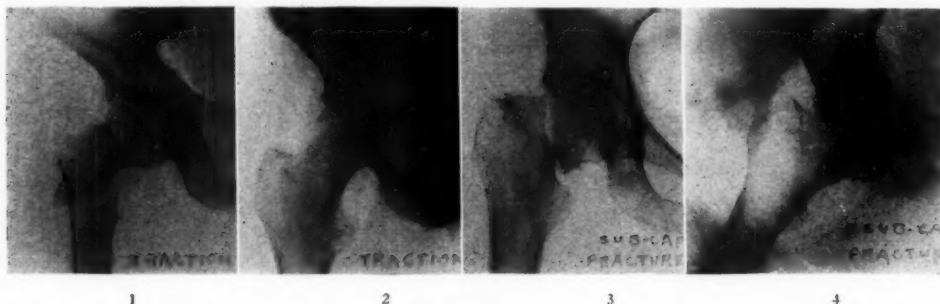


Fig. 1. Intertrochanteric fracture of the neck of the femur.

Fig. 2. Result of treatment by traction of fracture shown in Figure 1.

Fig. 3. Intracapsular fracture of neck of femur.

Fig. 4. Result of treatment of fracture shown in Figure 3 by Whitman abduction method.

in the reduction of the displaced fragments to as nearly the normal relationship as possible, and the retention of the apposed fragments until union has taken place.

In fractures of the shaft of long bones, perfect apposition of the fragments is not always accomplished by non-operative treatment; nevertheless, union with good functional results is the rule. In fractures of the neck of the femur, union is rarely obtained unless perfect apposition is accomplished, and good function is never obtained unless union results. There is no longer any question as to whether union in these fractures ever takes place; the question is, rather, in what percentage does union take place? Since the advent of the abduction treatment, we can correctly say that at least hope has replaced despair, and optimism is justified. Notwithstanding this, percentages in success means likewise percentages of failure. But at any rate, we can say that by this standard method of treat-

ment may be some theoretical reasoning regarding whether or not some part of the capsule is included in the fracture line, still for practical purposes, the old classification of extra and intracapsular fracture of the neck of the femur is important. We may say that the nearer the fracture to the cartilage covered head, the greater danger of non-union; or, in other words, the nearer the fracture to the trochanters, the far greater likelihood of union, until we come to the intertrochanteric and peritrochanteric regions, when union practically always occurs and greater latitude in manner of retention is allowed.

With the intracapsular fracture, the standard method of treatment is the abduction treatment, which consists of reduction of displacement, apposition of fragments and retention in apposition until union takes place—and after this a prolonged period of protection. Statistically the percentage of union with this treatment may be placed at about 65 per cent. Perhaps those who report as high as 80 or 90 per cent have not had a sufficient number in which to meet the inevitable failures which would reduce their high per-

*Presented before the annual meeting of the Minnesota State Medical Association, Minneapolis, May 6, 1931.

centages. This unfortunately has been the experience which has given to me a becoming sense of humility and a recognition of the true state of affairs.

It would hardly be possible in the time allotted this subject to go into details of treatment. I hope to show rather on the screen what results

There seems to be some doubt whether the atrophy of the neck is due to some inherent cause in the neck itself, or whether it atrophies secondarily to lack of sufficient osteogenetic properties and non-union in the head. At any rate this atrophy of the neck occurs quite early in some cases. Schmorl says it may become evi-

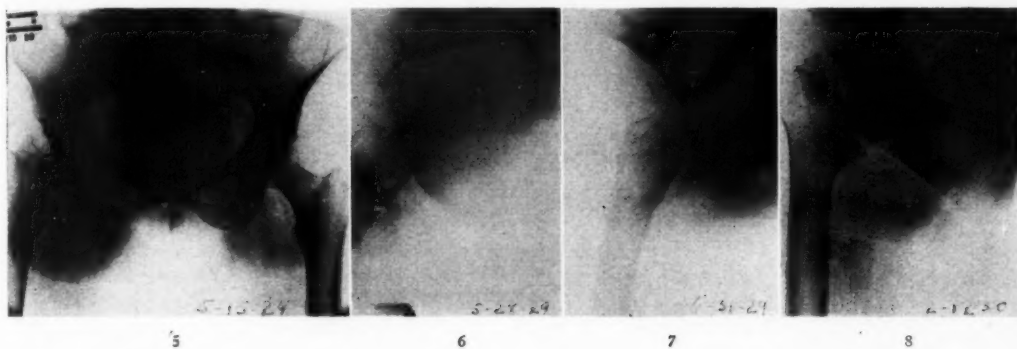


Fig. 5. Intracapsular fracture of neck of femur.

Fig. 6. Reduction of fracture shown in Figure 5 by abduction method.

Fig. 7. Atrophy of neck in case shown in Figures 5 and 6.

Fig. 8. Final result in case shown in Figure 5, showing support obtained by the lesser trochanter impinging on the head. Functional result—patient walks with help of a cane.

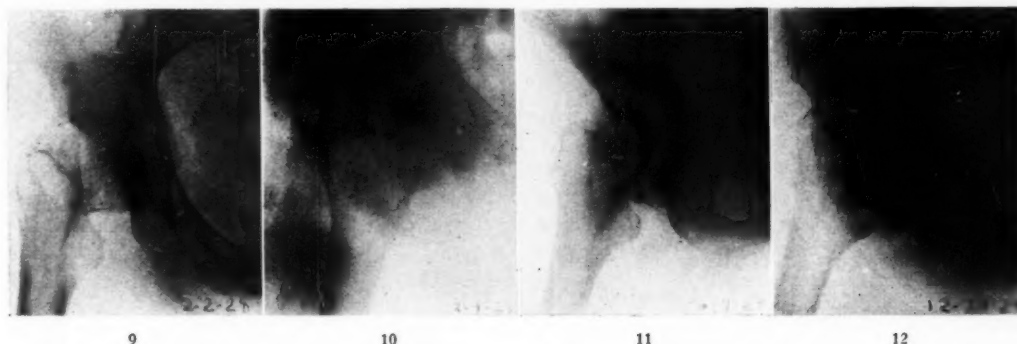


Fig. 9. Intracapsular fracture of neck of femur.

Fig. 10. Reduction obtained in case shown in Figure 9 by Whitman method.

Fig. 11. Atrophy of neck in case shown in Figures 9 and 10.

Fig. 12. Final result in case shown in Figures 9 and 10, support obtained by lesser trochanter impinging on head. Functional result—poor.

can be obtained and where the results have not been good to try and indicate why.

In our experience the failure of union has been due to absorption of the neck, and, except in one case, not to the condition of the head. In this one case, the patient had been afflicted with poliomyelitis in early life, and, his subcapital fracture not uniting, a reconstruction was undertaken. The head was found to be yellow and soft—perhaps necrotic would best describe the condition.

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dent in a few weeks. Lorenz puts it very clearly when he says one must not blame the unfavorable anatomical conditions alone for the bad results in fractures of the neck of the femur, and only do so when incomplete reduction and faulty retention can be excluded. Insufficient protection later must also be excluded.

It is not sufficient to take a radiograph before and after reduction, but to take them also during the progress of the case and correct a possible displacement.

What about the cases in which we do not get union after standard treatment? Briefly, there are various methods of helping these patients, depending upon the exact condition present:

1. Manipulation and reapplication of the cast.

Before resorting to operative treatment, however, it is well to consider the following facts:

1. Twenty per cent of all of those afflicted with fracture of the neck of the femur die in the first month.

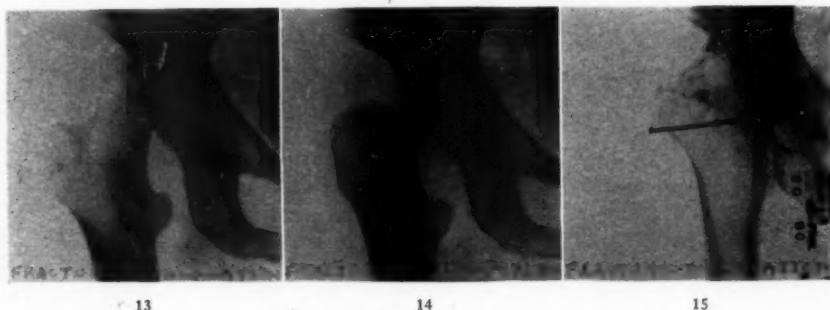


Fig. 13. Fracture dislocation of intracapsular fracture of neck of femur, part of head remaining in acetabulum.

Fig. 14. Case shown in Figure 13 after manipulation, part of head remaining on dorsum of ilium, the other half remaining in acetabulum.

Fig. 15. The result of Whitman's reconstruction operation in case shown in Figures 13 and 14. Functional result—patient walks with a cane.

2. Exposing the fracture, freshening the ends of the fragments and again treating with abduction and a cast.

3. Adding to the above a bone peg or transplant.

4. Whitman's reconstruction operation.

5. Backett's reconstruction.

6. Lorenz forking operation.

Some of these operations, Whitman's reconstruction, for instance, may be performed as a primary procedure, because in the judgment of the surgeon there is no hope for a functional result in non-operative treatment.

2. Failure in abduction treatment can be followed by various operations later on.

3. Success in bone transplant (pegging) results in selected cases.

4. In 20 per cent of all well treated cases bony union fails and pseudarthrosis occurs.

5. Twenty per cent of all pseudarthroses give comparatively good functional results, due to fibrous union and compensatory support.

6. In numerous cases fibrous union finally become osseous after a greatly prolonged treatment. Perhaps we may use the term delayed union here.

FRACTURE OF THE HUMERUS*

HENRY W. MEYERDING, M.D.

Rochester, Minnesota

THE automobile has produced an unusual number of serious accidents in which the saving of life is the first consideration, the saving of the injured extremity with good functional result second. The physician who is first to be called in these emergencies must be prepared to meet the immediate effects of trauma and to act to prevent complications. Shock, pain, hemorrhage, injury to nerves, atrophy, stiffness of joints, even infections, frequently can be prevented by prompt modern treatment. Aided by exact diagnosis as to type of fracture, which the roentgenogram permits, results are better and the period of disability is shortened. The value of traction splints was clearly demonstrated in the World War, and is today recognized and recommended almost universally. The simplicity of construction, ease and rapidity of application, and low cost, further make them desirable as standard appliances which hospitals, ambulances, and practitioners should have available.

I favor conservative treatment of fractures, and believe that excellent results are obtained by reduction and fixation when applied before swelling and edema occur. Nevertheless, I do not hesitate to perform open reduction and internal fixation when conservative measures fail, and when I encounter certain fractures which in my experience require these measures. Results of both methods of treatment vary greatly in any given type of fracture, depending not only on the methods employed, and on the skill and experience of the physician, but also on the health, co-operation and environment of the patient. My observations lead me to believe that failure of open operation is mainly due to infection, although both inadequate internal and external fixation play a part. The surgical expert who treats fractures in the modern hospital observes a minimal amount of infection and practically no mortality. He may feel that his excellent anatomic and functional results warrant him in operating for fractures as a routine. The general physician who skillfully carries out conservative or closed

treatment is following what is for him a much safer procedure, and his results, in uncomplicated cases, may equal or exceed those of the physician who performs an open operation only occasionally. The best results should come from the experienced fracture teams, surrounded by the most modern of facilities, with patients under constant observation and control.

As an emergency device for fractures of the humerus the Thomas-Murray splint is excellent. Having inspected and palpated the arms to compare bony landmarks, noted any interference with nerve and blood supply, and dressed any abrasions, the ring is slipped up the arm and traction applied by means of adhesive tape or a temporary cuff. The traction splint provides continuous pull, which tends to correct deformity, to prevent injury to the soft tissues and consequently to lessen pain and shock. In a few moments after the physician's arrival the patient is ready to be transported comfortably to home or hospital. Compound fractures are likely to be infected by rubbing and attempts at cleaning applied at the scene of accident. It is better to employ only a sterile gauze pad as first aid; if necessary, later, thorough debridement can be carried out and antitetanic serum administered. The exact injury to soft parts, hematoma, paralysis, and evidence of interference with circulation must be noted. Roentgenograms on which are recorded the date they were made, whether they are front or side view, and the arm involved should complete the record even though reduction has been performed with the aid of the fluoroscope. Later embarrassment and worry are minimized when such records are available, for with the automobile age came also the medico-legal, insurance and compensation age. Following treatment, roentgenograms at intervals of two to three weeks are indicated to determine whether position is satisfactory. The physician should bear in mind, however, that he is concerned with restoring form and function primarily, not anatomic alignment. The roentgenogram has focused attention on perfect reposition, and in attempts to obtain it I feel that much

*From the Section on Orthopedic Surgery, The Mayo Clinic, Rochester, Minnesota. Read before the Minnesota State Medical Association, Minneapolis, May 6, 1931.

harm sometimes has resulted to soft parts. In deciding on treatment, age of the patient, his physical condition, the type of injury he has sustained, and his economic circumstances should receive consideration. The public expects perfect anatomic and functional results in the shortest possible time. Various agencies interested in the economic phases of treatment and disability demand details of treatment, prognosis, and progress. The wise practitioner will seek counsel early when confronted by the unusually serious and complicated fractures.

A factor in the success of any treatment involving fractures of the humerus is the anatomic sense of the physician. Thus, in fractures of the anatomic neck of the humerus the rounded head, facing upward, inward and slightly backward from the shaft, may slip about like a saucer. Fracture of the greater tuberosity of the humerus, by virtue of the pull of the supraspinatus muscle, makes reduction difficult unless traction is made in the direction of the fractured part. The action of the deltoid muscle in fractures above and below its insertion affects the position of the proximal fragment. The *teres major*, *latissimus dorsi* and *pectoralis major* muscles pull the lower fragment forward and inward. The long head of the biceps muscle may be torn or may lie between the fragments. Although the humerus may be broken by direct or by indirect violence, it, more than any other bone, fractures from muscular action. The radial (musculo-spiral) nerve lies in a groove in close proximity to the humerus as it winds its way downward. It may be injured by sharp edges of bone at the time of the accident, during manipulation, or by pressure of callus, producing wrist drop.

The humerus is one of the most common sites of nonunion. In fractures of its lower third supination forces the lower fragment outward, and tends to cause flexion due to the muscle pull of pronation. When the edge of the bone is sharp and hemorrhage lifts up the periosteum, tension may be increased, forcing the radial nerve against the bone and causing paralysis. Pronation permits the distal fragment to line up more easily, and splinting, the action of the triceps muscle and acute flexion permit retention of fragments. The internal and external condyles lie forward of the axis of the humerus. The carrying angle bends the extended forearm away from the body at an angle ranging between

162° and 178°. The coronoid fossa in front, and the olecranon fossa behind, lie between the condyles, and are necessary to permit full movement of the elbow. Thus, callus, fragments of bone, or malunion, which interfere with the normal shape of the structures named, cause limitation of motion. When supracondylar fractures are improperly reduced, the end of the distal fragment is pulled backward, and the proximal end forward and downward to compress blood vessels and nerves about the antecubital space. Hemorrhage becomes increasingly dangerous as the site of fracture comes closer to the elbow. Therefore, the greatest care is required in preventing intrinsic and extrinsic pressure, or else Volkmann's ischemic paralysis results.

Fractures of the humerus are usually roughly divided into those of the upper end, the shaft and the lower end. Like fractures of other bones, those of the humerus may be simple or compound, or pathologic or spontaneous. Table 1 is a classified list of fractures of the humerus.

TABLE 1
FRACTURES OF THE HUMERUS

Upper end	Fracture-dislocation of the shoulder
	Of the anatomic neck
	Of the surgical neck
	Of the tuberosities
	Epiphyseal separation
Shaft	Transverse
	Oblique
	Comminuted
Lower end	Supracondylar
	Transverse discondylar
	Of the external condyle
	Of the internal condyle
	"T" or "Y" fractures into the joint
	Epicondylar, internal and external
	Epiphyseal separation

In a series of 114 recently studied injuries involving the humerus, there were twenty-four dislocations of the shoulder, ten of which were complicated by fracture in the upper third of the humerus; twenty-one fractures without dislocation of the surgical neck; one fracture of the anatomic neck; one comminuted fracture of the head; one epiphyseal separation; two fractures of the greater tuberosity; twelve fractures of the shaft; forty-one fractures of the lower third; three fractures of the lower third, with dislocation of the elbow, and eight dislocations of the elbow. Some of the fracture dislocations of the shoulder were of weeks' standing. Sir Robert

Jones, in his presidential address to the International Society of Orthopedic Surgeons at Paris, in October, 1930, spoke as follows:

"Some years ago I was engaged as a witness of a medicolegal case. One of the issues referred to the method of reduction which should be employed in a case of dislocation of the head of the humerus with fracture of the surgical neck. Many distinguished surgeons in 1906 did not know of such an injury. They were astonished to hear that fifty years before the Christian era, Pasicrates, in describing the injury, stated that he preferred to reduce the dislocation and then to allow union of the humerus. Aristion, on the contrary, endeavored to so arrange traction that it would act on both head and shaft simultaneously. Heliodorus supported the contention of Pasicrates. It is of profound interest to realize that in olden times, just as today, schools existed, one in favor of immediate reduction and the other in favor of allowing the shaft to unite before dealing with the displaced humeral head: and so it is always."

In fracture-dislocation of the upper part of the humerus, the dislocation is sometimes unrecognized for months, resulting in permanent partial disability of the extremity, in spite of the most expert reconstructive surgery. Inspection, palpation, and roentgenograms to include both shoulders should be made whenever doubt exists. I have seen and operated on patients weeks after injury, in whom dislocation had not been recognized, although roentgenograms had been taken and treatment had been given for fracture. An attempt to reduce the dislocation should be made as soon as possible, and always with anesthesia. By abduction traction of the arm, and pressure in the axilla with foot or hand, most dislocations are reduced. If one waits for swelling to subside or union to take place, adhesions and scar tissue may fix the head so that great force is necessary, and injury to blood vessels and nerves about the axilla may result. I have found that careful dissection with the knife is required in cases of long standing. Every effort should be made to save the head and replace it in the glenoid cavity, but at times this cannot be accomplished. Once the dislocation is reduced, the treatment is carried out as for fractures of the upper part of the humerus. If internal fixation by Lane plates, bone screws, or Parham bands is employed, active motion can be started immediate-

ly, and the functional result will be excellent. This is a type of injury in which early consultation is urged, especially when great swelling, injury to nerves, or infection exists.

Fractures of the anatomic neck are rare, usually are of the impacted variety, and occur in elderly patients. If position is fair, a sling and rest for two or three weeks is ample. When the head is loose and displaced, traction, after manipulation or open reduction, and early movement, are indicated. In cases of long standing, the head, which is loose and is the cause of pain, should be excised. Recumbency in the aged is avoided, and active movement, assisted by the physician, is urged. Forceful movements are avoided as being painful and harmful, but if it is necessary to break up adhesions, this must be done with the greatest care and under anesthesia.

The common fractures of the surgical neck include those that are below the tuberosities, involving the proximal fourth of the shaft. On inspection it may be mistaken for axillary dislocation. The proximal fragment is pulled upward and forward, the lower fragment is pulled forward and inward, and traction is made in the direction in which the proximal end points. The position of choice in treatment is abduction 90°, external rotation 90°, with the elbow at 90°, and the humerus forward of the sagittal plane 30° to 45°. Traction following reduction is maintained in recumbency by any of the abduction splints, such as the aeroplane splint, the Cramer wire splint, or by spica casts. Active motion of the hand and elbow is begun at once. Besides being most useful for maintaining reduction, this position prevents swelling and edema, and the early movement inhibits atrophy and stiffness. Should impaction be present, and the fragments in good position, a sling and plaster of paris shoulder cap are sufficient. Since many of these fractures occur to patients who have severe bodily injuries, recumbency is often preferable to ambulatory treatment. With overhead suspension of the forearm, and lateral traction applied above the elbow or through the olecranon, by means of a rustless steel pin, the physician has more certain control of the patient. Too often bandages and splints lose their efficiency through interference by relatives and friends. The physician is held responsible, irrespective of what the patient may do. Usually fixation for four to six weeks is required; movement of the shoul-

der is allowed at the end of a month, but movement of the elbow and hand is encouraged from the beginning.

Fracture of the greater tuberosity is frequently complicated by subglenoid or anterior dislocation, and results from direct violence or from shearing force. Treatment is directed toward bringing the arm to a position so that the fragments which are pulled upward and backward may be replaced. This is accomplished by abduction, external rotation, and pressure. When displacement is not great, good results may be obtained by simply a sling. Irreducible fractures are exposed through the posterior Kocher incision, fastened by suture or by beef bone screws, and early movement begun. Abduction external rotation splints are recommended. The treatment of epiphyseal separation is essentially the same.

Fracture of the shaft by direct lateral force is usually transverse. Indirect transmission of force may cause oblique or spiral fractures, and many of the cases of comminution result from extreme muscular effort. The results are usually good, although the shaft is a common site of nonunion, and injury to the radial nerve is not unusual. The presence of wrist drop immediately after injury demands expert advice as to operation. Late paralysis in the region of distribution of the radial nerve is due to pressure of callus, and may disappear in the course of a few weeks, as hardening of callus and shrinking take place. Inadequate fixation, interposition of muscle, and overstretching are factors in the production of nonunion. The commonly used short compression splints and sling are inadequate and lead to many of the imperfect results. They permit too much movement of the fracture, and the weight of the arm, unless constantly supported, tends to produce faulty alignment and to favor edema. Elevation of the forearm in recumbency or supporting it on an abduction splint prevents edema and permits movement of elbow and hand. Too often the apparatus applied extends from the wrist to the site of the fracture or just above it, and the slightest movement of the forearm is transmitted to the fracture. When good apposition of transverse fractures is obtained, a well fitted shoulder spica, extending well onto the forearm, is satisfactory and safe. If there has been great injury to the soft structures, hemorrhage or edema, recumbency is preferred. In overriding and spiral fractures, manipulation or trac-

tion may fail to bring about approximation, and open operation may reveal interposition of muscle. Rough handling of these fractures should be avoided, and the physician must be sure that the nerve is intact before treatment, for, if paralysis occurs, he may be held responsible.

TABLE 2

SITUATION OF FRACTURES IN 128 CASES OF
ISCHEMIC CONTRACTURE

Situation	Cases
Humerus	56
Radius and ulna.....	19
Radius	17
Radius and humerus.....	6
Ulna	3
Clavicle	3
Metacarpals	3
Tibia and fibula.....	3
Miscellaneous	18
Total	128

Fracture of the lower end of the humerus, in spite of expert care, may end in disastrous complications. The physician, to be successful, must know the exact extent of the injury. Is it an intra-articular or an extra-articular fracture? How do the two arms compare as to carrying angle, swelling, length, movement, deformity, circulation? Roentgenograms, following careful clinical observation, should be made in two planes. If the joint is involved, hemorrhage and fixation tend to produce stiffness, or even ankylosis. Loss of carrying angle, injury to nerves and that dreaded sequel, Volkmann's ischemic contracture, should make the physician regard seriously these fractures of the lower end of the humerus and be guarded in his prognosis. After reduction the position of choice is flexion, for it favors good function in bending the arm toward the body, and aids in most instances to retain the fragments in good position. If marked swelling exists, reduction is deferred until elevation of the arm reduces it. In no case is it wise to force flexion, with hemorrhage and edema threatening to impair circulation. On the other hand, the pulse, color, and temperature should always be observed, and if hematoma or the position of the bone causes interference, the clot is removed and the position of the fracture is changed by open reduction. Watchful waiting, if gangrene or ischemic paralysis threaten, is contra-indicated; a few hours of waiting may mean loss of the usefulness of the limb. The situation of the frac-

ture in 128 cases of ischemic contracture is given in Table 2.

The most common of the fractures of the lower end of the humerus are supracondylar. They are seen frequently in children, resulting from

with manipulation of the lower fragment into position, and then acute flexion, the fracture is reduced and maintained by muscular pull and by the splinting action of the triceps muscle. Supination tightens the pronator muscles, and their



Fig. 1 (Case 1). Fracture-dislocation of left shoulder.



Fig. 2 (Case 1). Fracture-dislocation of left shoulder, reduced.

falls on the hand or elbow with the arm extended; the lower fragment is carried backward, the upper fragment, forward, and the periosteum of the humerus becomes stripped up for several inches. In adults who fall on the stiff, flexed arm, the lower end is pulled forward. Muscular pull maintains displacement; hemorrhage, often severe, increases intrinsic pressure, and if flexion without proper reduction is maintained, or marked swelling is present before manipulation, the stage is set for ischemic contracture. The fracture must be reduced, and the sooner the better. Whenever possible a reliable observer should be engaged for the first forty-eight hours to see that circulation is adequate. Too often stiffness, sloughs from pressure, and contractures are present on the physician's second visit, and inquiry discloses that the patient has suffered great pain, which was relieved by drugs. The cold, blue, swollen, wet hand was unnoticed; the injury has been done, and now months of treatment, with uncertain prognosis, begins. Let it be remembered that Volkmann's ischemic contracture may occur in cases in which treatment has not been given. By hyperextension, traction

pull tends to force the upper end of the lower fragment outward, and also flex the elbow. This may cause pressure against the radial nerve, and paralysis may result; pronation is therefore advisable, for it makes easier reduction and retention and avoids injury to nerves. Adhesive plaster passed over the shoulder and over the forearm is frequently used to maintain flexion, or the Jones cuff suspended from the neck. They permit inspection, palpation, and loosening if necessary. Light plaster of paris moulds cause less pressure and are perhaps preferable. Early, active motion is essential in preventing stiffness.

Transverse dicondylar fractures involving the joint require similar care. Fracture of the condyles and capitellum, if not displaced, require immobilization in splints or plaster for two to four weeks. When satisfactory reduction by manipulation fails, open operation and suture, or a bone screw, are indicated. The ulnar nerve may be injured and early suture or late transplantation may be advisable. The arm is placed in the position at which the fragment seems to hold its place, and a well fitted splint or cast is applied and is allowed to stay in place for two

or three weeks. At the end of this time, gentle, active movement aided by the physician, with the splint off, results in restoration of movement.

"T" and "Y" fractures, and intercondylar and multiple fractures resulting from falls on the el-

applied as a massive inlay, held by bone screws. Cancellous bone, curetted from the tibia, is then forced about and between the freshened ends. The periosteum and the muscles are then pulled snugly over the region of the graft. Finally, the



Fig. 3 (Case 2). Nonunion of right humerus, with loose Lane plate and pseudoarthrosis.



Fig. 4 (Case 2). Autogenous bone graft held in place by beef-bone screws six months after operation for nonunion of the humerus.

bow, often drive the olecranon up between the condyles and split the humerus. Moulding and traction are indicated, with flexion. Skeletal traction, with a rustless steel pin thrust through the olecranon, and abduction casts or splints, give better results than if the arm is held at the side. Open reduction, with fixation of fragments, is only for the expert, working with the most careful technic. The earlier motion can be started, the better the motion which will result. Epicondyles, if displaced, may be sutured or removed. Epiphyseal separations may be reduced by manipulation, and traction may be used if flexion fails to maintain them in position. Immobilization is maintained for three or four weeks.

Nonunion of the humerus requires the care of an expert bone surgeon who is accustomed to a technic which involves many special instruments and which exacts the utmost in aseptic precautions. After exposure, the ends are freshened or excised; the medullary cavity is drilled out, and the ends are brought together. A properly shaped graft is removed from the tibia and is

skin is closed without drainage. A plaster spica cast to fix the humerus and support the forearm is used until union is firm.

REPORT OF CASES

Case 1.—A man, aged twenty-five years, was injured in an automobile accident and was taken to the hospital unconscious. Emergency treatment was given, and roentgenograms were taken, which gave evidence of a split in the head of the humerus, and dislocation. Traction was applied, and four days later, when his general condition was satisfactory, he was referred to the clinic. Open reduction and internal fixation, by means of three beef-bone screws, held the fragments in anatomic position. He wore an abduction cast three weeks, at the end of which time he returned home, able to abduct his arm 60°. Thirteen months following the accident he reported that function of the shoulder and arm was normal (Figs. 1 and 2).

Case 2.—A woman, aged twenty years, sustained a compound fracture of the middle third of the humerus twenty-two months previous to her visit to the clinic. After fixation in splints for two months she had been operated on for delayed union; a "bone graft and four hole steel plate" were applied. Nonunion and drainage resulted; the plate became loose and she

came for an opinion as to the value of further operation. The Wassermann test was negative. The Lane plate and screws were removed; the pseudo-arthritis was excised, and an autogenous bone graft, held by four beef-bone screws, was applied. External fixation consisted of an abduction spica cast extending to the

It was thought that an open operation would be necessary, but manipulation under anesthesia was first tried and the fracture was easily reduced. The patient wore a sling, and in two weeks had practically full flexion and extension (Fig. 5).

Case 4.—A boy, aged nineteen years, sustained a



Fig. 5 (Case 3). Lateral view of fracture of capitellum of the humerus.



Fig. 6 (Case 4). Volkmann's ischemic contracture and scars from slough of skin.

hand. The patient left the hospital twenty-four days after operation, and the cast was removed at the end of three months, when sound, bony union and good function existed (Figs. 3 and 4).

Case 3.—A nurse, aged nineteen years, fell, injuring her elbow. Roentgenograms were taken immediately, and a diagnosis of fracture of the capitellum was made.

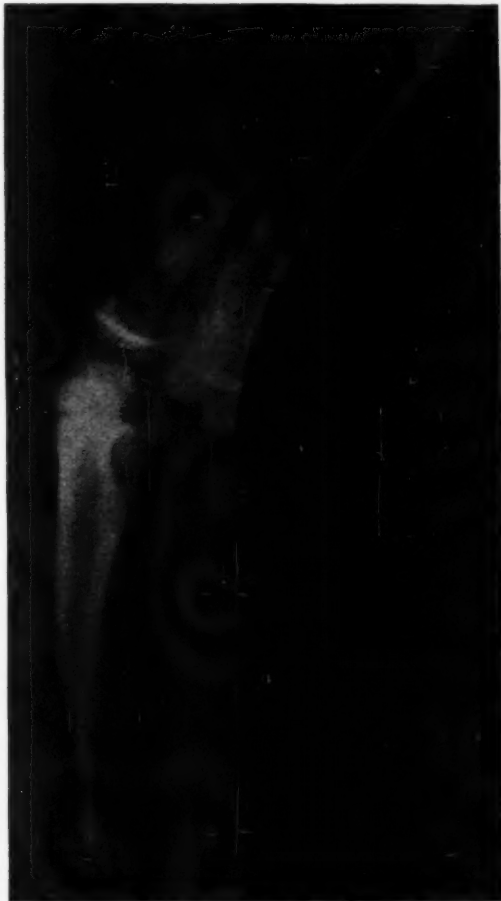


Fig. 7 (Case 5). Comminuted fracture of lower end of humerus.

supracondylar fracture of the right humerus six years previous to his visit to the clinic. He had been treated by manipulation, flexion, and a wire splint. The next day, the hand had been black and swollen, and his physician had taken off the dressing for an hour; then he had reapplied the same splint, and had left it on two weeks. A hand splint had then been applied and worn for a month, but in the distribution of the radial nerve paralysis had occurred and numbness had been present. A slough from pressure had appeared on removal of the first dressing, and the marks of it show clearly in Figure 6. Stiffness of the elbow, wrist, fingers and hand had resulted, which had persisted in

spite of any treatment. Osteotomy of the humerus for malunion and tendon transplantation for injury to the radial nerve was performed. The patient left the hospital on the sixteenth day. Five months later his physician reported good function.

Case 5.—A woman, aged thirty-one years, was thrown from an automobile, striking on the right elbow. She was taken to the hospital and roentgenograms gave evidence of a comminuted fracture of the elbow of the "T" type, with a split of several inches in the humerus. Open reduction was immediately performed, and traction was made by wire through the olecranon. The arm was supported on the abduction splint, and she left the hospital on the eleventh day. The splint was taken off at the end of four weeks, a sling was used, and physical therapy was begun. She has returned to her usual occupation, has good flexion, with motion of 70°, and is still improving after nine months (Fig. 7).

SUMMARY

Fractures and dislocations of the humerus should be immediately reduced and retained by apparatus which permits motion of joints and avoids edema and pain. Abduction traction splints are most serviceable, easily made, economical, and should always be available. The

condition of the patient, in this age of serious accidents, may require measures to save his life first, but emergency traction by simple means during transportation and after are best. A knowledge of anatomy is indispensable, for muscular pull, conformation of bone and distribution of nerves must be taken into consideration. The conservative methods are favored, but when they fail early operation is to be resorted to by one accustomed to it. Active motion is to be encouraged and gently assisted by the physician, when, in his judgment, it is safe. Passive and forceful movement of stiff, painful joints is harmful. Fractures of the surgical neck and upper end of the humerus are not infrequently complicated by dislocation. Roentgenologic examination before reduction and in the course of treatment is urged. One should always be on guard for injured circulation, especially in fractures about the elbow. Flexion, when marked swelling occurs, should be avoided. Volkmann's ischemic contracture may occur without use of splints or casts.

FRACTURES OF THE ANKLE JOINT*

J. S. HOLBROOK, M.D.

Mankato, Minnesota

IN this necessarily brief discussion of fractures of the ankle, a few principles of treatment will be mentioned in the hope that they will be of help in the care of these cases.

The ankle has a hinge-like motion, and that only, normally. The very strong internal and external lateral ligaments hold the foot very firmly. The tibiofibular ligament holds the bones very stoutly together, and thus prevents lateral motion between them and the astragalus. There is a very strong attachment of the fibula to the astragalus by ligaments, which are so firmly attached that the astragalus remains attached to the fibula and is displaced with it in severe ankle injuries. Dickson² says that this is the key to the whole situation.

In the ankle joint the weight of the body is carried by the small articular surface between tibia and astragalus, when the flat surface of the former glides over the rounded convex surface of the latter. This near mortice joint is so firmly held by the capsule and its thickened portions—the internal and external lateral ligaments—that there is practically no lateral motion. The lateral motion which we get in this neighborhood is between the os calcis and the astragalus.

Up to about 200 years ago, the injuries of the ankle were considered dislocations, and treated as such. However, Pott and Dupuytren began to teach that these dislocations were often accompanied by fractures. These men did some wonderful work, considering that their diagnoses had to be made from the appearance of the ankle and examination by touch and manipulation. For the past thirty-five years the roentgen ray has been increasingly used, and the films have become so uniformly good that the pendulum has swung so far that the injuries about the ankle joint now are estimated by the amount of fracture.

Cotton and Berg¹ brought out the point that these injuries are really dislocations, often accompanied by fractures, as taught by Pott and Dupuytren about 200 years ago, and that they should be treated with this idea in mind. They classify the ankle injuries as:

1. Outward dislocation—Pott's Fracture.
2. Inward dislocation—reverse Pott's fracture.
3. Backward dislocation—Cotton's Fracture.
4. Upward and forward dislocation.

In the first class, the outward dislocation, the foot is displaced outward, the internal malleolus is torn off, and the fibula fractured about two inches above its lower end. Reduction of this fracture by forcing the foot inward will bring the fractured bones into proper position. One cannot over-correct it.

In the second class, the inward dislocation carries the foot inward and upward, and the external malleolus downward. The treatment consists of forcing the foot downward and outward, pushing it into place and maintaining it in this position.

In the third class, the backward dislocation of the foot with a fragment torn from the posterior part of the tibia is reduced by pulling the foot forward, and fixing it in dorsal flexion.

In the fourth class, which consists of a crushed lower end of the tibia with upward displacement, the fibula is seldom fractured. The upward thrust shortens the shaft of the tibia one-fourth to one-half of an inch, the amount depending upon the severity of the fall. There is a spreading of the ankle joint due to rupture of the tibiofibular ligaments. There is so much swelling and deformity that the diagnosis should be made by the X-ray. The treatment consists in correcting the displacement under an anesthetic, molding the fragments of the comminuted tibia into place, and extending the foot by use of a Sinclair skate, or otherwise; and maintaining corrected position much longer than external and internal dislocation-fracture. If reduction of fragments cannot be maintained, open reduction and nailing may be necessary.

I here will report the case of a boy, aged seventeen, who slid off the roof of a barn, landing on his feet. He claims that he fell 30 or 40 feet. He suffered a fracture of the left os calcis, and a comminuted fracture of the lower end of the right tibia, with the usual upward thrust, and shortening of one-third of an inch. Two at-

*Read before the Minnesota State Medical Association, Minneapolis, May 6, 1931.

tempts were made to maintain reduction in this case, but it could not be done until the fragments were nailed onto the shaft. Quite a large piece of the articular surface was found entirely separated and was removed. This boy made a good recovery, having almost normal motion in both feet.

The second hint in treatment comes from Edward Holman Skinner of Kansas City,⁴ who has devised a mean of estimating the amount of displacement and probable functional disability which is likely to result from a given ankle fracture. The restoration of the astragalus to its normal relation to the tibia is the result to be sought. The weight bearing line of the tibia should pass directly through and bisect the articular surface of the astragalus. A line so drawn on a film will show the amount of displacement of the astragalus.

Skinner remarks "that even though the apposition of the fragments may not be perfect, the functioning result will be satisfactory, if the weight bearing line is restored to normal alignment. Apposition of the fragments may be sacrificed to the restoration of function."

The third suggestion for treatment is by Fraser B. Gurd,³ who tells of the use of the pillow splint at Montreal General Hospital. This splint has been used in that hospital for twenty-five years with gratifying results in fractures of the ankle. In his paper he says: "In our Clinic, following reduction, the leg is placed in a pillow splint. For this purpose a moderately deeply feathered pillow is required, covered with a pillow-slip made of some strong material. The leg is placed upon the center of the pillow, with the latter projecting about 6 inches beyond the heel. The pillow is made to surround the leg, commencing about or, better, above the knee, and firmly secured by means of safety pins placed in the long axis of the limb. Working from above downward toward the ankle joint, safety pins are placed in this way at short intervals. In this manner, lateral and circular compression is exerted. This is of value in limiting the swelling, and forcing, by gradual pressure, if reduction has been incomplete, displaced fragments into position. This is particularly useful in overcoming separation of the tibia from the fibula."

The foot is held by the pillow in dorsal flexion. The advantage of the pillow splint is that there is

no danger of ischemic paralysis. It can readily be opened up for observation, and re-adjustment may be made several times the first few days. No extra board splints are put within the pillow case. X-ray should be taken through the pillow. The foot remains in this splint until the swelling is gone, when a circular plaster of Paris bandage is applied without employing padding. This remains on for ten days. It is then bisected, the posterior part being retained for a splint. Light massage and diathermy, baking, and active motion are employed for six days. Then another cast is applied with a heel, one inch thick, strapped on.

Gurd says, "By this method many return to work a week or two after the injury." He claims more perfect results than by other methods.

The fourth method of treatment of fractures is that advocated by Böhler. I understand that he always uses a local anesthetic, consisting of 10 to 20 c.c. of a 2 per cent novocain solution, injected directly into the break. I have used this with satisfactory results on many occasions.

His method of taking care of fractured ankle is to have the patient lie with his injured leg hanging over the end of a table. He molds the fragments into place, and applies a posterior splint of plaster of Paris, molded about the malleoli, and then a circular plaster of Paris bandage over that. The leg is not shaved, and there is no padding used, the plaster being put directly on the skin. After this has set slightly, a piece of strap iron, one-eighth of an inch thick and three-fourths of an inch wide, is bent so as to project one-half inch below the heel, and extend up the sides of the leg internally and externally. At the upper ends are cross-pieces to aid in holding the iron firmly. This is incorporated in the cast by several thicknesses of plaster bandage. In many cases the patient is encouraged to walk within two hours after the accident.

I have not used this method in an ankle, but did in a case of fracture of the tibia in its middle third. The patient did very well. While at the hospital he walked around the bed many times, but when he returned home, after three days, the family doctor and the patient's friends persuaded him that it was a very risky thing to do—so he used crutches. However, he immediately went back to his work as a stock-buyer, and lost but

four days work, after the leg was put into a cast. He was very much pleased with the result, and felt that his disability had been greatly shortened by allowing him to get about.

The method carried out by Lorenz Böhler allows the patient to continue his occupation and saves him much time and expense. He claims for it that there is but little swelling, and the patient is very comfortable.

To recapitulate:

1. Always make free use of the X-ray before and after reduction, taking antero-posterior and lateral plates.
2. An anesthetic should always be used at the time of reduction.
3. Consider ankle injuries as dislocations with possible fractures.
4. Reduce the dislocation, and as a rule the fracture is reduced with it. You cannot over-correct it.
5. Draw a line on the X-ray plate, through the tibia in the direction of the weight bearing line, and see where it crosses the astragalus. It

should be through its center. If not, get a better reduction.

6. The pillow splint may be used to good advantage.

7. Familiarize yourself with the Böhler method, because it is very valuable, and no doubt will become more popular the more it is used.

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GENERAL PHYSICAL EXAMINATION*

E. L. TUOHY, M.D., F.A.C.P.
Duluth, Minnesota

THE morning program readily shows you that I have been given a totally impossible subject, "physical examination." Fortunately, the brilliant and gifted speaker, Professor Luten† from St. Louis, has preceded me and has given to you my introduction. You have seen how carefully he has pointed out the extraordinary value of a proper history, a proper evaluation of the symptoms offered by the patient who comes to consult you, and has discussed the paucity of evidence that is often accumulated after exhaustive routine examination. Those who shall follow me will present to you that objectivity which shall give you peace and calm, whereas I shall give you that subjectivity which may perhaps test your patience.

The public have been greatly charmed for many decades, if not centuries, by objectivity and examination. The quacks have ever been eager to adopt it. So today we see newspaper advertisements of machines in front of which the patient may sit or stand or lie as a vigorous individual may peer through this machine and do the lying afterwards. Many of us have had to deal with individuals of various grades of intelligence, not to say of acquaintance with our language. I might even give this to you in semi-poetic form:

Mister da Doc
I been a sic,
Maka da pic,
Pain in the bell,
It hurts like —.

Finish this up according to your desire—poetry or prose! Translated it means that this individual has been told by some neighbor that if he would come to me, or to a doctor thus chosen, we have an occult machine which may be turned toward him and an X-ray be made of his interior. From that (giving no credit whatever for the use of intellectuality in attempting to extract his story or to properly proportion it), he will be able to find out the cause of the internal

discomfort which happens to be in the instance gastro-intestinal.

Out of such basic attitudes comes the notion held by many of our leaders that routine examinations will tell us all needful things. That this is held even in high places is evidenced by the effort on the part of the A. M. A. and this State Association and others to carry on a worthy endeavor intended to popularize periodic health examinations. It is part and parcel of the same notion now carried on by many public laboratories or health extension institutes based upon the belief that by taking a certain series of notations, measurements of one sort or another, one can arrive at an estimate of the status of the individual and judge accurately his life expectancy. I need not bring into the argument at all the obvious fallacy involved in the sending of a specimen of urine to this or that laboratory, and from that magic fluid some static sage may conjure up your future or expeditiously divine the type of pruning needful for your family tree. At least we know the chief thing that happens is the diversion of some \$25 from the local community to Chicago or some other city which boasts of such talent.

It is said that the great Voltaire was so very critical of our profession that he thereby evidenced his extreme interest in it. The modern Voltaire is no doubt George Bernard Shaw, who is so critical of us that he exhibits his true appreciation of our possibilities. Critical as was Voltaire of our profession, he was even more critical of the church; he was rather roundly condemned by both. So it is stated that at the time of his death a priest was sent for who came in. Still in his doubting and quizzical attitude, Voltaire said, "Who are you?" The priest replied, "I come from God." Voltaire, half dead, wheezed, "Your credentials, please."

So what are my credentials? Whence have I come? Well, I have practiced medicine rather intensively for twenty-five years, and it just happens that I have been associated most of the time with unusually well poised confreres, trained in various specialties. I know therefore how valu-

*From the Department of Medicine, The Duluth Clinic, Duluth, Minn. From stenographic report of address before the annual meeting of the Minnesota State Medical Association, Minneapolis, May 5, 1931.

†Professor Luten's address on Cardiology and the General Practitioner appeared in the October number of the Journal.

able routine examinations may be. I began as a laboratory man. I had the first modern fluoroscope brought into the northern part of this state. I did the first spinal puncture, so far as I know, that was done in my county and gave the first antimeningococcic* serum intraspinally in Minnesota. My active interest in laboratory routine has been far too intensive to lead me to condemn the practices that my successors, dealing with objectivity, are going to present to you, but I am here to tell you that 75 to 80 per cent of the folks that come to us will have no surcease, no comfort, no benefit whatever from any or all isolated and extensive detail. Such will give great comfort and satisfaction to 10 per cent of complainers. For 15 or 20 per cent, they will help profoundly in ruling out organic diseases, but if they apply spinal punctures and cystoscopies and such forbidding routine upon a mass production industrial basis, they will drive many neurotics to the shelter of the Christian Science fold or to the sublime vacuity of chiropractic.

I therefore enunciate a statement of principle with which I am sure most of you will agree: We must all begin with as distinct an understanding of the complaints the sick individual presents as it is humanly possible to get, and then we may apply such tests and technical adventures as judgment and experience dictate, which may result in a maximum both of information and benefit. First of all find out why the individual presents himself to you and listen attentively to his story. The real art of medicine is the art of getting a history. Professor Luten has already propounded that thesis logically and convincingly. This is the soundest of medical tenets; ancient and modern. Permit me to read to you briefly from the remarks made by Professor Charles P. Emerson, well known teacher of Indianapolis, in talking on this same subject:

"In this age of standard output and mass production, you cannot deal with medicine and its problems as one would with fabrics, wood or steel. Patients are not alike. Medical students come to admire the consultant who will see a patient for two minutes, then refer him to the various sets of departments, eye, ear, nose and throat, psychiatric, roentgenological and otherwise, and then take five minutes in which to round up the situation, and treat the patient. This may be good business but it is very bad medicine. I do not even believe it is good business. It does not work."

*The late Professor Frank Wesbrook, just back from New York, had been given some of the earliest product by Flexner at the Rockefeller Foundation.

He says that the more laboratory work he has done on patients the more necessary was it to find out why he had any at all and how to interpret it. I tell you a great deal of the cost of physical examination is not the fault of the medical profession but the fault of folks who fancy that unless you institute a long sequence of objectivity, they aren't getting anything for their money.

That great medical philosopher of Minnesota, William James Mayo, some years ago enunciated the proposition in my presence, "Why should people have to pay you or any doctor who needs a great series of equipment and a lot of detailed examination in order to help him make up his mind? Why isn't it just as valuable that you are able to use your experience, your judgment, your analytical powers and give the man that opinion, without this objectivity?" Like many philosophers who speak so vividly, so honestly and so correctly, of course he went right on to apply that principle in his practice at Rochester and developed a remarkable line indeed, including Dr. Braasch. (I single out the cystoscope not because of any inability to appreciate its virtues but because of an inherent horror of its vices.) There is a very faulty assumption not only by the laity but many physicians that the Mayo Clinic and other good clinics throughout the world magnify and emphasize routine examinations. I wish to assert that no clinic can survive that has not early learned that success is unattainable without the utmost use of the human intellect, and the keenest analysis of that subject most difficult to understand, namely, the human consciousness. It is God's greatest gift to man; and, by all odds, the greatest tyrant inducing disturbances which bring 75 to 80 per cent of our patients to us suffering from this or that. They are usually called neuros. I introduce the painful subject only to dismiss it. It is that type of individual that challenges the medical profession today, from the standpoint of the expense of having an examination, the effort involved in finding out his difficulties, the lack of knowledge of world affairs on our part, the inability to plumb the depths of social relationships, insulating so many of our finely trained fellows from their patients. And what a great disadvantage! Because a man with good personality and intelligence even though a faker or a quack establishes an emotional contact that

binds irrespective of logic or reason. Therefore, learn to sit down and listen to your patient's story. Write it out as it is given to you. Keep records.

It is not easy to get a history. Many people camouflage their real complaint. They lead you astray. They have seen other doctors and they wish to know what you think about their problems. They give you a story that leads away from the main issue, which is probably fear of cancer or fear of going insane or fear that the mother-in-law may not go home. One needs to be observant and skillful; to check them up, criss-cross back and forth. But write down your gleanings; some of these are very general impressions.

Let me cite an illustration! It has only recently come into our consciousness that there is such a thing as hypoglycemia occurring in normal individuals under emotion or strain. They present a curious syndrome. It may suggest gastric or duodenal ulcer and on occasion is associated with tachycardia. I recall a man who had spent three weeks with a cardiologist trying to get straightened out. His story emphasized a sudden tremulousness and weakness with fast heart beat; he felt very, very uneasy. When he came to the doctor he had only the story of these things. I wrote all that down; but I didn't tumble to what he had. I went ahead and examined and talked to him on the basis of a neuropath with cardiac signs. The next day, in looking over my chart, I said, "Here we are. What was the matter with me? Where was my thinking apparatus?" I called this man back and said, "Did you have a very good night the last two nights?"

He said, "No, I get that same thing. It wakes me out of my sleep."

In general, people do not awaken from neurotic discomforts. I said, "I know what is the matter with you and I totally overlooked it the other day. Take some chocolate or a chocolate bar, put it down by your bed, and just as soon as you feel that coming on, take two or three bites and your distress will go away. Try it." It worked like magic. My explanation satisfied both of us. It is not my purpose to present a monograph upon the subjective manifestations of entities as real as hypoglycemia. Rather do I wish to borrow from the popular province of radio the illustration of "tuning in." I am sure

we saw cases of tularemia prior to an epoch making observation of an interne at St. Mary's hospital. He found the first case of tularemia in Duluth by reading the *Journal of the American Medical Association* and possibly MINNESOTA MEDICINE. We now know we are "tuned in" on tularemia. Likewise on Malta fever. Diagnostic leads orient the historical approach. The danger of "seeing" a diseased gallbladder in every well nourished dyspeptic simply illustrates the incalculable need of judgment and honesty. Questions may be less leading than informative: "Did you have a sore on your finger before you had the lumps up here (axillary)? The tularemic man then divulges the rabbit episode. "Did you, sir, before you had this feeling that we are talking about (hypoglycemia), go without food?" "Yes, I went without food. I was on a considerable bat the night before. The next day I thought I wouldn't eat anything and my wife said, 'You had better go out and get some fresh air'." He walked rapidly for four miles, exhausted all the glycogen in his body, had this hypoglycemia, called a physician and was three weeks in the hospital under the combined medical and lay impression of "acute cardiac dilatation." The episode should not appear in medical annals but in certain addenda to the Wickersham report!

I spoke of judgment, and what a thing is judgment! How does one get it? You get judgment by reading, by coming to meetings like this, watching patients who are operated upon, cultivating acquaintance with autopsies and pathologists. One gets it through contact with his fellow-men; it comes in a good many forms. I think you see what is on my mind. I introduce these other men. I ask you to listen attentively to their warnings and exhortations. Specialistic technic is most valuable, but do not reach out for it until you have gone as far as is reasonable with simple processes of analysis and a thoroughgoing exhaustive review of your patient's major complaints. Do not try to buffalo the patient or yourself by directing her attention away from a sore tongue to a malposition of the uterus or laceration of the cervix, because, as a rule, she is right. You should watch these folks with burning, painful throats that you call neuros. You should keep in touch with the best medical meetings of the country. For instance, I asked an observant colleague, "What was the best

thing you got out of the meeting of the American College of Physicians at Baltimore in March of this year?" The answer came back, "Minot (without the help of Murphy) gave a talk on the overlapping of pernicious and secondary anemia." Some months previously some of us had hit upon the same notion, that some patients with painful throats and sore tongues even with-

out classical blood (laboratory) changes indicative of primary anemias, are revived when treated with large doses of iron and raw liver given in cold tomato juice. Thus have I used up all my time in my discursive approach to the patient. This is just as well. You are as familiar as I am with the technic of examinations.

THEELIN AND THEELOL

The announcement three years ago of the separation of a potent ovarian hormone from the follicular fluid by Allen and Doisy marked a distinct step in the direction of progress. The product had an estrus-promoting activity that could readily be assayed. Other investigators also have been engaged in the study of ovarian hormones, and medical journals carry accounts of a considerable number of products, each designated by some trade name. A new era was ushered in when Doisy announced, at the thirteenth International Physiological Congress in 1929, the isolation of a hormone in crystalline form. The Council on Pharmacy and Chemistry of the American Medical Association adopted the name "theelin," selected by Doisy, as the nonproprietary designation to be used in New and Non-official Remedies for the ovarian hormone made by the process of Doisy. Last year Doisy and his co-workers recorded the discovery of a second estrogenic substance in the urine of pregnant women. It is a triatomic alcohol for which the name theelol has been proposed. Theelin appears to be approximately twice as active as theelol in adult spayed rats, whereas, theelol is six or seven times as active as theelin in immature female rats. It is too early to speculate on the possible uses of these two substances. (Jour. A. M. A., July 4, 1931, p. 33.)

HEALTHOLA DIABETIC FLOUR NOT ACCEPTABLE FOR N. N. R.

Healthola Diabetic Flour, according to the label on the package, contains protein, 49.73 per cent; fat, 24.56 per cent; carbohydrates, 15.92 per cent, and contains no sugar or starch. According to the advertising of the distributors, Healthola Diabetic Flour Co., Huntington, W. Va., "Healthola is a flour made from an imported vegetable." No statement of the identity of the product is contained on the package or in the advertising nor is there a statement that in the body the protein contained in the product is largely converted into carbohydrate. The Council on Pharmacy and Chemistry finds Healthola Diabetic Flour unacceptable for New and Non-official Remedies because its identity is not declared on the label and in the advertising; because its name is not descriptive of the composition but therapeutically suggestive instead, and because the claims are misleading and unwarranted. (Jour. A. M. A., July 11, 1931, p. 103.)

FROM N.N.R. TO THE U.S.P.

Of the forty new products in the United States Pharmacopeia X, thirty-one came from New and Non-official Remedies. No better recommendation can be given for "N.N.R." (Jour. A. M. A., September 26, 1931, p. 931.)

INTRAVENOUS UROGRAPHY*

WILLIAM F. BRAASCH, M.D.
Rochester, Minnesota

IN the differential diagnosis of abdominal disease a generation ago, surgical lesions of the kidney were often overlooked, but with the development of cystoscopic and allied data they have been recognized more frequently. The necessity of excluding the kidney in cases of doubtful diagnosis, and the fact that it is better for the patient to have a renal lesion discovered by cystoscopic examination than by abdominal exploration was realized slowly. Patients generally were not submitted to urologic examination because of the comparative inaccessibility of such examination and the technical difficulties involved; nevertheless the desirability of a method which would eliminate these factors and which would be available for general use was obvious.

The solution of the problem was made possible by the discovery by Rowntree and his associates that a large amount of sodium iodide given intravenously was excreted by the kidney in sufficient amounts to permit visualization of the urinary tract by the roentgen rays. The application of the method was not widespread, because visualization of the renal pelvis and ureter was uncertain and inadequate, and because of the systemic reaction of many patients to the presence of free iodine in the system. It remained for German chemists to discover that iodine when organically combined was better tolerated and afforded clearer visualization of the urinary tract. Roseno of Cologne was the first to make this discovery, but unfortunately the agent he suggested was toxic. Shortly afterward it was found that another iodine-bearing compound called "selectan" was even more opaque to the roentgen rays and was not toxic. As the result of the combined work of Swick, Binz and von Lichtenberg, this compound was brought out in the form of a substance called "uroselectan." At the same time Bronner of Cologne discovered another form of organically combined iodine which was similarly nontoxic and afforded even sharper visualization when employed intravenously. This substance was called "abrodil." Both

uroselectan and abrodil have been placed in the hands of the American profession and have been widely used. The former has been named "iopax" and the latter "skioldan."

Intravenous or excretory urography offers the medical profession an opportunity to obtain data concerning renal conditions in a comparatively simple and practical manner. Although in many cases it will not be sufficient in itself to determine the exact condition of the upper part of the urinary tract, and additional data will be necessary to complete the diagnosis, nevertheless it will often give a better idea of the existence of a renal lesion and its nature than could be obtained by any other method short of cystoscopic examination. It should be employed in every case in which there is any question of the existence of renal disease other than nephritis, and it will undoubtedly lead to the recognition of renal lesions which are now overlooked.

The method will be of great help to the urologist, since it offers the possibility of obtaining additional data which were not available by previous methods. Its greatest value will be in the possibility of investigating the upper part of the urinary tract in cases in which cystoscopic examination is physically impossible or inadvisable. Such cases will include deformities involving the urethra or bladder, contracted and markedly diseased bladders, obstructions to the ureter, conditions otherwise inaccessible, and many cases in which the patients are children.

When intravenous urography is employed in general diagnosis it will be of greatest value in the recognition of urinary stasis, and in the identification and localization of renal and ureteral lithiasis. There should also be less difficulty in recognizing the frequently overlooked disease, hydronephrosis, and in identifying and localizing shadows in the renal and ureteral areas which were suggestive of lithiasis. The determination of the functional capacity of the kidney involved, as well as that of the opposite kidney, should be of exceptional value to the general surgeon.

TECHNICAL CONSIDERATIONS

The technic of administration is comparatively

*From the Section on Urology, The Mayo Clinic, Rochester, Minn. Read before the Minnesota State Medical Association, Minneapolis, Minnesota, May 4 to 6, 1931.

simple. The patient is given the usual preparation for roentgenography, and the iodide compound is injected slowly either by the gravity or syringe method, with the patient in a recumbent position. At present, skiodan is the medium of choice because its administration is not accompanied by untoward symptoms and since it gives clearer visualization than iopax. It is ready for use in sterile ampules in 25 c.c. of a concentrated solution. In recent months iopax has been modified, and claims have been made that it offers unusually good visualization without causing subjective symptoms.

Attempts have been made to concentrate a maximal amount of the excreted substance in the renal pelvis by both excretory and mechanical methods. The former may be somewhat abetted by limiting the fluid intake for several hours prior to urography. Retention of the medium may be attempted by placing the patient in the Trendelenburg position and by placing a compression bag over the lower part of the ureters for ten minutes before exposure.

Intravenous urography is contra-indicated only in case of advanced renal insufficiency or general weakness. I have employed it, however, for several patients whose blood urea was 100 mg. for each 100 c.c. of blood and for others who were feeble, without observing any ill effect. A serious objection to the method is the exorbitant cost of the iodine compounds which are now available. It is to be hoped the cost will be brought to a level which will permit of their more general use.

In describing the advantages which intravenous urography offers in general diagnosis, it should be noted that there are a number of factors which militate against its universal employment; they are as follows: (1) visualization of the renal pelvis is frequently too dim for exact interpretation; details of calices, particularly the minor calix, are frequently quite obscure; (2) visualization of the ureter is often fragmentary and inadequate; (3) exact urographic interpretation is difficult without considerable experience; (4) it is necessary to have cystoscopic data in order to obtain a complete diagnosis in most cases and to exclude vesical conditions, and (5) reflex inhibition of renal excretion interferes with appraisal of renal function.

INCOMPLETE VISUALIZATION

Unfortunately, the intravenous urograms do not afford a uniform degree of visualization. For some unknown reason, apparently an idiosyncrasy, kidneys which are otherwise normal will excrete a variable amount of the iodine compound injected intravenously so that the renal outline is frequently too dim for interpretation. Complete failure of excretion may result because of the reflex action from intrarenal stone, and this may be confused with lack of function. With renal insufficiency, as indicated by blood urea of 100 mg. or more for each 100 c.c. of blood, excretion of iodine will be inadequate to visualize the renal pelvis. Frequently one side will be fairly well seen and the other will be too dim for interpretation. One must not expect to have the pelvic outline as clear as that observed with retrograde urography. It is often necessary to inspect carefully the various films taken at different periods after injection in order to obtain an approximate idea as to the outline of the pelvis. In all such cases retrograde urography and allied cystoscopic observations should be employed.

UROGRAPHIC INTERPRETATION

The difficulty of interpreting the intravenous urogram may offer a serious impediment to its universal employment. Exact interpretation is dependent on wide experience in recognizing the normal and abnormal outline of the renal pelvis. Although in a large number of cases the condition will be easily recognized, there will be many in which interpretation, without the benefit of wide experience, may be difficult. Furthermore, additional data such as can be obtained only by means of the cystoscope may not alone be desirable but necessary, in order to obtain accurate interpretation of the urograms as well as a complete evaluation of the conditions present. The data obtained from the intravenous urogram are often only complementary to the cystoscopic examination, and the ability to recognize its limitations is necessarily dependent on a wide urologic experience.

HYDRONEPHROSIS

In most cases in the diagnosis of hydronephrosis, intravenous urography is preferable to retrograde urography (Figs. 1, 2 and 3). In spite of every precaution that may be taken there

is always a possibility of infecting the kidney by means of retrograde catheterization and urography when retained urine is present. Danger of infection is completely obviated by intravenous urography. I have never observed any

number of lesions such as neoplasm of either cortical or pelvic origin, occluded renal tuberculosis, ureteral angulation and extrarenal pressure. If there is sufficient renal tissue to secrete iodine, intravenous urography offers the only

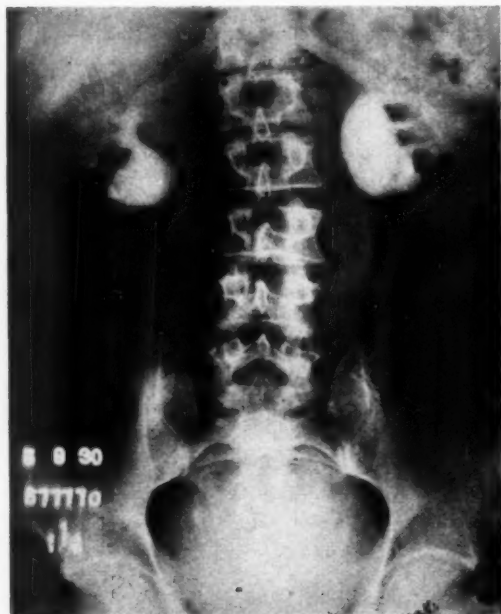


Fig. 1. Intravenous urogram, showing bilateral hydronephrosis, and obstruction at ureteropelvic juncture.



Fig. 2. Intravenous urogram, showing right hydronephrosis and hydro-ureter, with obstruction at the intramural portion of the ureter.

irritation in the renal pelvis as a result of retained medium injected intravenously, although some patients with hypersensitive bladders will complain of vesical irritation. Another advantage of intravenous urography is the coincident visualization of the opposite side, permitting comparison of the two renal pelves. As a result it has been found that the incidence of bilateral hydronephrosis is undoubtedly greater than had been previously supposed. Pyelectasis in the opposite kidney may not show any symptoms. Intravenous urography is also preferable because it usually enables one to determine more accurately the site of ureteral obstruction. It is obvious that surgical treatment depends largely on whether the obstruction is in the lower or upper part of the ureter. With retrograde urography the injected medium may stop at the level of the kidney and there may be no evidence of it above the point of obstruction. This may occur with a

means of determining the nature of the lesion causing such obstruction.

LITHIASIS

It is well known that shadows frequently appear in roentgenograms of the urinary tract which are difficult to identify without cystoscopic data, and as a result the diagnosis may remain doubtful. Surgeons have often explored the kidney or ureter for stone unsuccessfully, with no more exact evidence than was afforded by the roentgenogram. With intravenous urography such shadows can usually be identified and localized by the general profession (Fig. 4). Not alone will the urogram determine whether shadows are in the kidney or ureter, but it will determine their exact location. In the majority of cases the shadow of the stone is visible in the outline of the involved pelvis or ureter more distinctly than in the retrograde urogram. The

method will also permit recognition of the comparative renal function of both kidneys and demonstrate any coincident disease or anomaly which may exist in either kidney. If small renal stones are present, the lack of detail in the out-

RENAL TUBERCULOSIS

The lack of detail observed with intravenous urography frequently renders the method of doubtful value in the diagnosis of renal tuberculosis, renal tumor, and polycystic kidney, par-



Fig. 3. Intravenous urogram, showing huge hydronephrosis and hydro-ureter on right side with complete duplication of renal pelvis and ureter on the left.

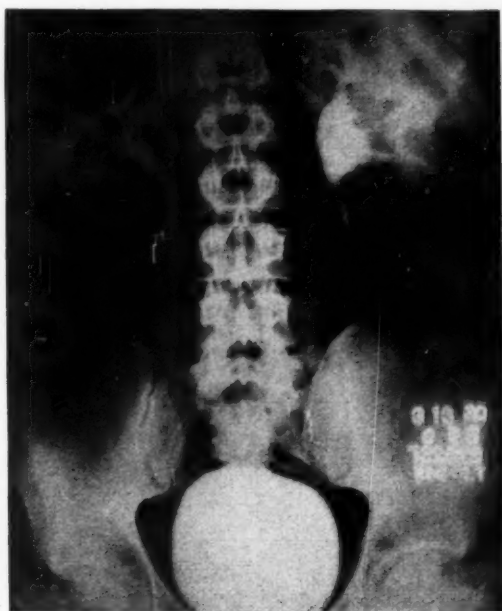


Fig. 4. Intravenous urogram, showing stone in left upper ureter causing obstruction; a shadow is visible in the upper part of the ureter.

line of the calix or pelvis may not permit identification or localization. The method is of value in visualizing the best method of surgical approach to stones situated in the ends of the calices as well as any deformity or dilatation of the calix affected. Localization of a stone in the ureter also may be accomplished more accurately and with much less inconvenience to the patient. It obviates the danger of serious secondary infection which occasionally occurs in the presence of an occluding stone in the ureter. As a rule, evidence of stasis will be present in the ureter, accompanied by a variable degree of ureterectasis. This may be either general or localized to the portion of the ureter adjacent to the stone. If it is not possible to visualize the ureter because of diminished renal function or for technical reasons, it will be necessary to employ retrograde urography.

ticularly in the early stages. The recognition of early renal tuberculosis often depends on the recognition of deformity in the minor calices so that their clear visualization is necessary. In order to accomplish this, retrograde urography is usually preferable. When ureteral catheterization is impossible or contra-indicated, the difference in visualization of the two kidneys may be of value in the recognition of tuberculosis. If, for instance, the bacillus of tuberculosis is found in the urine and a normal kidney is visualized on one side, evidence of delayed or diminished visualization on the other side, even though not clear, would indicate disease. With stasis resulting from stricture the deformity with tuberculosis is occasionally clearly visualized. However, it is usually inadvisable to depend on the intravenous urogram alone in the surgical treatment of renal tuberculosis, since catheterization of one

or both ureters is usually necessary to determine if one kidney is normal. When one kidney has been catheterized and found to be normal, and it is impossible to catheterize the other, intravenous urography may be of great value.

RENAL TUMOR

Renal tumor in its early stages, or when situated so as to cause little deformity in the calices or pelvis, may also be difficult to recognize in the intravenous urogram (Fig. 5). The more advanced the lesion and the greater the pelvic



Fig. 5. Intravenous urogram, showing fragmentary calices dimly visible in a case of large left abdominal tumor. A diagnosis was made of left renal tumor; the right kidney was normal.

deformity the more readily will it be recognized. Failure of visualization of the renal pelvis, or the outline of scattered calices in contrast to a normal pelvis and calices on the other side, may be of value in the identification of abdominal tumor. The detailed outline of the deformed, elongated calices regarded as typical of renal neoplasm will seldom be clearly visualized and the retrograde urogram will often be necessary.

Polycystic kidney can be easily overlooked in the intravenous urogram. It is well known that excretion of dye is delayed and diminished with polycystic disease. As a result visualization of

the renal pelvis and its details may be quite inadequate and may be accomplished only in films made a long time after intravenous injection. In the presence of stasis, however, the films may reveal an outline which is readily recognizable. It should be remembered that secondary stasis occurring with either of these conditions may be confused with the primary etiologic lesion.

RENAL PTOSIS

Intravenous urography should be of general diagnostic value in cases of renal ptosis. The degree of renal excursion can be determined by urograms made in both the dorsal and erect position. Of greater importance is the recognition of stasis in either renal pelvis or ureter, since this is the most significant factor in determining the advisability of nephropexy.

ANOMALY

The possible existence of anomaly of the kidney and ureter is usually overlooked in abdominal diagnosis, as well as in the course of cystoscopic examination, or even retrograde urography. Intravenous urography will undoubtedly determine the existence of anomaly involving the upper part of the urinary tract much more frequently than was possible formerly, and in many cases when clinical data would not indicate it. Duplication of the renal pelvis may easily be overlooked in the retrograde urogram if only one of the pelves is outlined and resembles a normal pelvis. Renal fusion and ectopic kidney are easily overlooked if the pelvis appears to be in a normal position. Intravenous urography visualizes both pelves, and their relation in position and outline and will usually determine the type of anomaly present.

LESIONS IN THE LOWER PART OF THE URINARY TRACT

The relation of the ureter and the kidney to lesions in the bladder and prostatic urethra can best be ascertained by intravenous urography. In fact, in the presence of a large tumor of the bladder involving the ureteral orifice, or of extensive prostatic obstruction, it is frequently impossible to determine the condition of the ureters and kidneys by means of cystoscopic examination and ureteral catheterization. If on cystoscopic examination the tumor in the bladder is found to involve the ureteral orifice, it is usually

impossible to catheterize the ureter and it may be difficult to determine its condition and the function of the kidney on that side. With intravenous urography the dilatation in ureter and pelvis, as well as visualization of renal function on the affected side, is made possible. This is of great advantage to the surgeon, particularly with a view to the possibility of transplanting the ureter or the necessity of performing nephrectomy. Incidentally, the cystogram resulting from intravenous urography may also show the deformity of the bladder caused either by a filling defect from a protruding tumor or pathologic change subsequent to prostatic obstruction. In fact, with every case of vesical neoplasm, an intravenous urogram should be made as a routine. Similarly, with prostatic obstruction visualization of ureterectasis or pyelectasis which might exist without any clinical symptoms to suggest it would manifestly be of considerable value. In the course of intravenous urography many unsuspected complications are frequently visualized, such as hydronephrosis, anomaly, or absence of one kidney.

It is evident, therefore, that, with the recent introduction of intravenous urography, medicine and surgery have been given a noteworthy addition to the methods of diagnosis. The medical profession has not yet awakened to the full realization of its adaptability or its general diag-

nostic value. In the course of time the ability to interpret the intravenous urogram will become more general. At present, however, it is still limited largely to the recognition of stasis and the identification of lithiasis; the necessity of correlation with other urologic data remains.

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THE VALUE OF THE ROENTGENOLOGIC EXAMINATION OF THE CHEST*

WALTER H. UDE, M.D.
Minneapolis

MEDICAL opinion has passed through many changes during the past year with regard to the place of roentgenology in the diagnosis of diseases of the chest. Viewed comparatively recently with open hostility by our most expert physical diagnosticians, it is now accepted more and more as the most valuable method of study at our disposal. Instead of having his field referred to as "bastard pathology" (Sir Thomas Horder), the roentgenologist is now being accepted as an expert consultant whose opinion must be given all due consideration, even if it brings out factors entirely at variance with physical findings. The clinician of today is the close friend of the roentgenologist, and the feeling existing between them is one of mutual admiration for each other's work. Where they thus work harmoniously, the clinician admitting his lack of expert training in roentgenology, and the roentgenologist qualifying his conclusions by possible errors in technic as well as by his not possessing the very important factors of the history and clinical course, these two will be of the utmost help to each other in the attempt to reach a diagnosis.

In discussing the value of the roentgenologic examination of the chest, one should exclude all studies based on roentgenograms which are lacking in technical quality, or which are interpreted by one with insufficient experience. The rapid development in this field of diagnosis has given us all the factors necessary to produce films of the best quality. Our medical schools, both under-graduate and post-graduate, are furnishing more and more well trained roentgenologists. Thus the adverse factors which tend to discredit the roentgenologic examination may be readily avoided. When they are not avoided they should not be used as an accusation against this entire diagnostic field.

The roentgenologic study of the chest may be considerably influenced by the condition of the

patient. Numerous circumstances may make it imperative not to remove the patient from his bed, allowing a bedside film only. With improved equipment and our newer methods of technic, this type of study is very satisfactory. Consolidation, atelectasis, pleural effusion, and other gross pulmonary pathology may be thus studied with a high degree of accuracy without annoyance or danger to the patient. However, for the most accurate study of the chest the patient should be able to cooperate sufficiently well so that stereoscopic films may be made with him in the erect position. For the careful study of minimal changes in the lung parenchyma, stereoscopic films are essential. Occasionally, men with wide diagnostic experience discount the value of the stereoscope. However, they recognize the value of having two films made at different positions of the tube, allowing the demonstration of infiltrations on one film which on the other may be overshadowed by the bony structures of the thorax. I venture to state that in a difficult case no roentgenologist will dispense with the aid of stereoscopic films, and in most instances will welcome the aid of the stereoscope. From the usual postero-anterior films of the chest it may be determined whether films in other directions or whether fluoroscopic examinations should be made to aid in arriving at a satisfactory conclusion. Lateral films of the chest are proving of invaluable help in many pathological conditions, and these films may be made at the bedside almost as readily as in the X-ray department.

Fluoroscopy may be of considerable aid in the diagnosis of diseases of the chest, although such observations are often misleading. It should never be relied on for the demonstration of early tuberculosis or other minimal pathologic changes. It may often aid in differentiating a pathologic process which has been demonstrated on the film. Many clinicians include fluoroscopy of the chest as one of the routine procedures in the course of a physical examination. In one of our well known sanatoriums, all patients are fluoroscoped

*From the Departments of Roentgenology of the Minneapolis General Hospital and the University of Minnesota. Read before the annual meeting of the Minnesota State Medical Association, Minneapolis, May 5, 1931.

on their first day in the hospital, and the findings are given to the clinician before he sees the patient.

The various pathologic conditions which are commonly found in the chest may be readily grouped according to the degree of accuracy with which they may be demonstrated roentgenologically. This discussion will not include diseases of the heart or pericardium. In the following classification the relative degree of accuracy with which the condition is demonstrated is indicated by its position in the group into which it is placed:

A. Diseases of the chest demonstrated roentgenologically with high degree of accuracy:

Diseases of the Lungs

1. Tuberculosis.
2. Lobar pneumonia.
3. Metastatic malignancy.
4. Massive atelectasis.
5. Pulmonary abscess.
6. Bronchiectasis, if studied with iodized oils.
7. Purulent bronchiolitis.
8. Bronchopneumonia.
9. Non-opaque foreign bodies in the bronchi.

Diseases of the Mediastinum

1. Thymic enlargement.
2. Aneurism of the aorta.
3. Substernal thyroid.
4. Calcification of tuberculous lymph nodes.

Diseases of the Pleura

1. Pneumothorax.
2. Pleural effusions:
 - Free
 - Encapsulated
 - Interlobar
 - Mediastinal
 - Hemorrhagic
3. Hydro-pneumothorax.
4. Diaphragmatic adhesions.
5. Calcified pleura.

B. Diseases of the chest demonstrated roentgenologically with moderate degree of accuracy:

Diseases of the Lungs

1. Chronic lung fibrosis.
2. Pulmonary infarction.
3. Pulmonary congestion.
4. Chronic bronchitis.
5. Bronchiectasis, without the use of iodized oils.
6. Emphysema.
7. Pneumoconiosis.
8. Primary malignancy.

Diseases of the Mediastinum

1. Lymphogranulomata:
 - Hodgkin's disease
 - Leukemia
 - Lymphosarcoma.
2. Non-calcified tuberculous lymph nodes.
3. Metastatic malignancy.
4. Mediastinal abscess.
5. Paravertebral abscess.

Diseases of the Pleura

1. Endothelioma.
2. Metastatic malignancy.
3. Thickened pleura.

C. Diseases of the chest demonstrated roentgenologically with difficulty:

Diseases of the Lungs

1. Mycotic infections.
2. Syphilis.
3. Acute bronchitis.

Diseases of the Mediastinum

1. Chronic mediastinitis.

Diseases of the Pleura

1. Pleurisy, acute, without effusion.

Because of its prevalence, tuberculosis of the lungs has been studied most extensively and thoroughly. Its characteristic appearance in the roentgenogram allows detection of the process in its very early stage, often long before any abnormal physical findings become evident. It is therefore clear that a film of the chest is essential whenever this condition is suspected. An adequate X-ray study of the chest which fails to show tuberculosis will rarely mislead the clinician, and is the best available evidence of the absence of this disease. Often extensive tuberculous infiltrations are demonstrated roentgenologically which were entirely unsuspected from the clinical examination. Cavities are readily demonstrated. Knowledge of the extent of the disease is also of importance in connection with the newer forms of surgical therapy. Finally, progress of the disease may best be observed by periodic X-ray examinations.

Although lobar pneumonia may be readily diagnosed clinically, it is often impossible for the clinician to determine its extent or its location. Here the roentgenograms, representing bedside antero-posterior and lateral films, may be of great help, and rarely fail to demonstrate even the very earliest stages of the disease. In this way we have recently been able to show that

lobar pneumonia always begins as a triangular consolidation the base of which is at the periphery, and that so-called hilum or central pneumonia is a misnomer and never occurs. We frequently find the earliest area of consolidation in the retro-cardiac region, so that the antero-posterior film alone may not reveal its presence unless one is exceptionally trained to evaluate slight changes in density within the cardiac shadow itself. In these cases the lateral film is very helpful, and often definitely diagnostic.

The use of iodized oil in the study of the chest has greatly increased our ability to demonstrate the presence of bronchiectasis. Without this aid the roentgenologic diagnosis of this condition is often impossible or may be only suspected. Purulent bronchiolitis is clinically readily confused with bronchiectasis. Roentgenologically it has a fairly characteristic appearance, although it may be confused with disseminated tuberculosis. Re-examination to observe progress will confirm the diagnosis.

Bronchopneumonia is most frequently found in the aged and in the debilitated, and usually has a very characteristic appearance. In the past the early consolidations of lobar (alveolar) pneumonia have frequently been interpreted as bronchopneumonia, necessitating later apologies when the consolidation assumed a lobar distribution. Atypical pneumonias such as accompany influenza may be difficult to classify. I consider these to be of the alveolar type in many instances, but this undoubtedly varies greatly with the type and virulence of the infection.

The above classification emphasizes the interesting fact that acute bronchitis is not readily diagnosed roentgenologically. Most of these cases show no demonstrable changes in the lung. Occasionally a soft diffuse increase in the broncho-vascular tree may be present with this condition. This must not be confused with the

prominence of the vascular tree found on films made with a comparatively long time of exposure. Stasis in the pulmonary circulation secondary to cardiac disease may also be very confusing, but can be differentiated by the study of the heart itself.

It is not within the scope of this paper to discuss all of the problems associated with the roentgenologic differentiation of the diseases which have been included in the above classification. Many of these do not show characteristic changes in the roentgenogram, and the findings are frequently merely "suggestive." This may apply to any of the conditions which have been enumerated. Further studies, periodic re-examinations, and prolonged observation may be necessary to reach a satisfactory conclusion. In these cases the friendly coöperation between clinician and roentgenologist is absolutely essential.

SUMMARY

1. Roentgenologic diagnosis in diseases of the chest has reached a high degree of accuracy, especially if it is aided by the friendly coöperation of the clinician.

2. Technical factors and a thorough knowledge of the applicability of the various methods of study are of great importance. Fluoroscopy and bedside films may be adequate to rule out the presence of gross pathology, but should not always be relied upon for absolute diagnosis.

3. There is a considerable variation in the degree of accuracy with which the various diseases of the chest may be diagnosed roentgenologically. This is emphasized by a classification of these diseases.

4. A single roentgenologic examination may often be inconclusive. Periodic re-examinations guided by clinical observation may be necessary to reach a satisfactory conclusion.

802 MEDICAL ARTS BUILDING.

THE VALUE OF ROENTGENOLOGIC EXAMINATION OF THE STOMACH AND GALLBLADDER*

HARRY M. WEBER, M.D.
Rochester, Minnesota

IN the three decades which have elapsed since the discovery of roentgen rays, application of roentgenologic methods to study of pathologic changes of the alimentary tract in the living subject has resulted in development of a diagnostic procedure which possesses unprecedented precision and reliability. The roentgenologic method has a fundamental and rational appeal. The information it supplies is largely visual, and hence objective. Herein lies its basic value, and the foundation for the great interest, even enthusiasm, with which roentgenologic procedures are generally received.

Observations made at laparotomy or necropsy may be at variance with roentgenologic data. However, the roentgenologist does not think that this constitutes evidence that the method is limited in its value. He considers, rather, that the observer has not fully appreciated the evidence which the method is capable of yielding. Correlation of data obtained by necropsy and laparotomy, with skillfully elicited roentgenologic findings, discloses not only that this attitude of confidence on the part of the roentgenologist is not unwarranted, but also serves to explain, at least in part, the accruing reliance which others place on the method.

A tendency may have been fostered in some quarters, however, to permit roentgenologic investigation to supplant the carefully elaborated clinical survey of the patient. Obviously such a tendency is to be discouraged. Those who appreciate the efficiency of the roentgenologic method, as well as its limitations, do not fail to evaluate its usefulness in terms of the patient. Little doubt can be entertained that the application of the roentgen rays to the study of disease of the upper part of the alimentary tract has contributed greatly to precision in gastro-enterologic diagnosis, but it is questionable whether or not the physician's burden has been substantially lightened by it. To him falls the lion's share

of the responsibility of passing judgment on the results of examination and of determining the procedure which is indicated in investigating the individual case.

Inquiry into the actual value of the roentgenologic method in the diagnosis of disease of the stomach and gallbladder is attended with not a little difficulty. Of necessity, one must consider how valuable it can be made rather than how valuable it actually is in a given set of circumstances. Obviously its utility and significance will be increased proportionately with the roentgenologic experience and skill of the observer, and with the regard for meticulous detail with which the data are elicited and interpreted. The method is all too frequently branded as inefficient only because the physician failed to avail himself of the full benefits which could have been reaped by proper utilization of the procedure. Neglect of such details as careful roentgenoscopic and roentgenographic technic, adequate preparation of the patient, and proper administration of contrast material, accounts for much of the unsound roentgenologic opinion which is promulgated.

Moynihan is quoted by Barclay as having made the statement that roentgenologic examination of the stomach is of more value than all other methods put together. At the present time, the method is so universally utilized that one might prefer to devote time to consideration of its limitations, but I shall endeavor to review, in a general way, some of the specific data which I feel the roentgenologic method can be made capable of providing.

Roentgenologic examination of the stomach and duodenum does not, in any sense, consist in exhibition of a technically good roentgenogram of these organs filled with opaque material. By chance, such a roentgenogram can be diagnostic if the pathologic process is extensive, or if a relatively limited involvement happens to have been projected in precisely the most advantageous manner. An apparently normal roentgeno-

*From the Section on Roentgenology, The Mayo Clinic, Rochester, Minn. Read before the Minnesota State Medical Association, Minneapolis, May 5, 1931.

gram is, however, never adequate to exclude the presence of disease. In recommending fluoroscopic examination of the stomach as the indispensable roentgenologic procedure, I am far from desiring to pass as inadequate or impractical the plan of "serial roentgenography" of Cole, and those of his followers who adhere closely to his teachings. I also recognize the excellence and diagnostic precision which the methods of Forsell, Rendich, and Berg are capable of yielding. The fluoroscopic examination, however, carefully and properly performed, can be made to produce a diagnostic efficiency practically equal to all of these methods, and has the additional advantages of convenience, rapidity, and relative inexpensiveness. The trained gastro-enterologic roentgenoscopist is confident that fluoroscopic investigation permits him to make adequate observations of the external contours of the stomach and duodenum; it allows him to rotate his patient in whatever position is necessary to demonstrate these contours, and by manipulation and compression of the gastric and duodenal walls he secures the essential details of the inner contours of these organs which he admits the methods of Berg and Forsell might demonstrate more clearly and graphically. Obviously the ideal roentgenologic investigation will include any or all procedures which will serve best to facilitate a clear-cut and complete diagnosis. Those who favor the roentgenoscopic method do not fail to appreciate the complementary and corroborative advantages of roentgenography, and do not hesitate to utilize it whenever expedient.

W. J. Mayo once made the statement that only about one patient in ten with gastric symptoms has a gastric lesion. If this is true, the first and most obvious value of roentgenologic examination will consist in the proficiency which it allows of selecting the one patient with stomach trouble on a basis of organic disease, from the overwhelmingly larger group whose complaints are of a functional nature, or whose symptoms are referred to the upper part of the alimentary tract from an organic lesion situated elsewhere in the abdomen. The question uppermost, then, in the physician's mind, when he has decided to submit his patient for roentgenologic examination, is, "Is or is not a gastric or duodenal lesion present?" The roentgenologic method can be made to furnish an explicit affirmation or negation in reply. Study of large numbers of patients

who had been subjected to roentgenologic examination of the stomach and duodenum previous to exploration reveals that the roentgenologic efficiency in correctly determining the presence or absence of organic gastric or duodenal disease runs consistently higher than 90 per cent. In other words, not more than 5 to 10 per cent of organic lesions of the stomach and duodenum escape detection by a properly executed roentgenologic examination, and in the absence of roentgenologic signs of disease a gross anatomic lesion can be definitely excluded from the clinical picture.

The roentgenologic method can and does extend its value beyond this point. For the institution of an intelligent therapeutic program a knowledge of the nature of the disease is essential. Is the lesion malignant or benign?

CARCINOMA OF THE STOMACH

The incidence of malignant disease in the duodenum is known to be low, but approximately a third of all carcinomas occur in the stomach, a figure which emphasizes the value of a procedure which will enable the diagnosis to be made as early as possible. In this respect, roentgenologic examination takes precedence over all other methods of investigation. Not only are roentgenologic signs of malignant disease clear-cut and pathognomonic in all those cases in which these conditions are detectable by other methods, but it is capable of revealing lesions which are as yet impalpable, and in which chemical and microscopic examinations of gastric content are not determinative. It is not an altogether uncommon occurrence for roentgen rays to uncover the presence of a gastric carcinoma which gave no other sign of its presence. On the other hand, negative roentgenologic exploration of the stomach for carcinoma almost precludes its presence, since, according to Carman, 95 per cent of carcinomas of the stomach at The Mayo Clinic were roentgenologically demonstrable. In the presence of a palpable tumor of questionable origin, roentgenologic examination distinguishes between intrinsic and extrinsic gastric tumors with greatest accuracy. Further, it has a most decided advantage over all other means of investigation in the clarity and precision with which it establishes the site, extent, and general anatomic characteristics of the process. Such information is of particular value in answer to the surgeon's

question concerning operability, and the particular surgical procedure he might see fit to initiate.

BENIGN LESIONS OF THE STOMACH

Although benign neoplasms of the stomach are rarely encountered, the roentgenologist is prepared to recognize them as such when they are present. He is disposed to designate such a lesion as a "polypoid tumor" because he is aware that a considerable variety of histologic types of lesions produce identical roentgenologic appearance. It is also known that especially one histologic type of polypoid tumor, the adenoma, although grossly benign in character, may exhibit microscopic evidence of malignancy. Many of these lesions are entirely unsuspected clinically, but some of them have been shown to be responsible for repeated obscure hemorrhages to which varying grades of secondary anemia are traceable. Adenoma may be single or multiple; the other histologic varieties are usually solitary lesions. Very small polypi are exceedingly difficult to recognize, but those which have attained the size of 2 cm. or more will scarcely ever escape roentgenologic detection.

By far the most commonly encountered benign gastric lesion is the gastric ulcer. Consummate roentgenologic skill is at times required to demonstrate very minute ulcers and those situated high in the cardiac portion of the stomach, yet the diagnosis of gastric ulcer is practically identical in accuracy with the diagnosis of other gastric lesions. Nowadays the roentgenologic diagnosis of ulcer of the stomach is based almost exclusively on the direct evidence of the lesion. The demonstration of the pathognomonic sign of the crater of the ulcer, or the niche, must be elicited, and in the absence of this evidence the roentgenologist hesitates to offer the diagnosis even in the presence of very suggestive indirect signs, such as the incisura, the hourglass deformity, and the diffuse gastric spasm.

Carcinomas of the stomach may become ulcerated, but in dealing with such a lesion it is unusual for the roentgenologic signs of malignancy to be so indefinite or obscure that its carcinomatous nature is not discerned. In other words, there is a definite roentgenologic syndrome with which carcinoma is identified, and a distinctive set of signs which denotes benign ulcer. It must be remembered, however, that certain ulcers of the stomach, which on roentgen-

ologic examination and gross inspection had all the features which we have learned to associate with a nonmalignant process, have been shown on microscopic examination to have malignant cells in their edges, and the subsequent condition of the patient bore out the validity of the microscopic disclosures. In those cases, the roentgenologist can hardly be expected to do more than allow his case to rest when he has offered his evidence of the presence of the lesion. Carman taught that gastric ulcers 3 cm. or more in diameter are likely to be carcinomatous, but ulcers much smaller than this have shown microscopic evidence of malignancy.

The gastric ulcer which occurs in the pyloric third of the stomach merits special consideration. In this situation, any ulcerative process, whether malignant or benign, may produce an obstructing deformity by a combination of spastic and organic changes, which makes roentgenologic determination of the precise nature of the lesion extremely difficult at times. Administration of an antispasmodic sometimes reduces the spastic component to a minimum, and thus lends valuable aid in bringing out the direct anatomic evidence more clearly. Frequently, however, the roentgenologic evidence admits of no more refinement than the report of an obstructing lesion at the gastric outlet. Exploration reveals that this roentgenologic picture may be the result of genuine malignant infiltration, single or multiple benign gastric ulcer, or obstructing duodenal ulcer with associated pyloric spasm.

DUODENAL ULCER

Examination of the duodenum is always included in the complete roentgenologic investigation of the stomach. Tumors of the duodenum are exceedingly rare, but the duodenal ulcer is an anatomic and pathologic entity of great practical importance. Fortunately the roentgenologic method is particularly efficient in demonstrating this lesion. The signs are so constant and reliable that it can safely be said that not more than 5 per cent of duodenal ulcers will escape expert roentgenologic investigation, and, on the other hand, negative results of roentgenologic investigation of the duodenum almost preclude the presence of duodenal disease. It seems necessary, however, to point out that although the characteristic bulbar deformity or the pathognomonic duodenal niche may be obvious even to the in-

experienced observer of roentgenologic shadows, the realization of full roentgenologic efficiency is likely to come only to the examiner who is particularly alert, attentive, and expert.

RARER GASTRIC LESIONS

Less frequently encountered diseases of the stomach are syphilis, tuberculosis, and actinomycosis. Gastric syphilis, however, occurs often enough to merit habitual consideration in gastric diagnosis. The roentgenologic syndrome is sufficiently distinctive to make rendition of the diagnosis possible in a high percentage of cases, but even if the roentgenologic evidence is not clear-cut and pathognomonic in every case, yet the presence of a gastric pathologic condition always will be indicated, and the roentgenologic examination may be said to serve a valuable directive and corroborative purpose. Tuberculosis and actinomycosis of the stomach are so rare that they have little practical diagnostic importance.

THE STOMACH AFTER OPERATION

Roentgenologic examination is often utilized to determine the functional behavior of the stomach after one of the various operations used in treatment of gastric lesions, and to aid in finding the cause of occasional unsatisfactory results. The commonest type of lesion one expects to find is the gastrojejunal ulcer after gastro-enterostomy, and local recurrence after resection for malignant growths. The roentgenologic diagnostic problem is made complex because of the physical and functional changes produced by the surgical intervention, and the method is not expected to maintain the precision it has in detection of the primary lesion. As roentgenologic experience accumulates, however, constant improvement in accuracy is noted, and with close coöperation of clinician and roentgenologist, the correct diagnosis is reached in all but a small percentage of cases.

THE GALLBLADDER

Abel and Rowntree, in 1909, showed that phenoltetrachlorphthalein is eliminated from the body chiefly in the bile. Fifteen years later, Graham and Cole applied this knowledge to introduce one of the most remarkable advances in diagnostic medicine, namely, cholecystography. By substituting, in the phenoltetrachlorphthalein molecule, the elements bromine or iodine for the

far less radiable chlorine, they came into possession of a dye which makes the ability of the gallbladder to receive and concentrate the dye-laden bile subject to roentgenologic scrutiny. Essentially, then, cholecystography is a qualitative test of the functional capacity of the biliary tract. It is not primarily a method of directly demonstrating pathologic change.

Gallstones, when they contain sufficient calcium, can give primary evidence of their presence on the roentgenogram. The gallbladder, too, when its walls are very markedly thickened or calcified, or when it is enormously distended with bile or fluid, can cast a primary shadow. Most gallstones, however, do not contain sufficient calcium to cast shadows and the percentage of definitely diseased gallbladders which can be demonstrated roentgenologically, without the use of the contrast dye, is so low that prior to cholecystography the roentgenologic diagnosis of cholecystic disease was generally held in rather low regard.

The Graham-Cole method was received with general enthusiasm, and it was soon learned that the extraordinary value of the procedure consisted in the exhibition of failure in function of the gallbladder. After the method had been in use for a time, it was determined that the gallbladder which was found to be pathologic, by the surgeon's gross examination, and by the pathologist's microscopic investigation, was unable to receive and to concentrate a sufficient quantity of the dye-laden bile to make itself roentgenologically apparent. At the present time, Kirklin, whose statistical studies are similar to those of other observers, finds that demonstration of the so-called nonfunctioning gallbladder means cholecystic disease in more than 96 per cent of the cases which he has been able to follow to exploration. It is important to note, in this connection, that in making this study, gallbladders in which there was minimal microscopic evidence of disease were not included as pathologic.

A normal cholecystogram, however, does not imply a normal gallbladder. This fact becomes obvious when one considers the great number of normally functioning gallbladders within the shadows of which gallstones are visualized. Moreover, Kirklin, Caylor, and Bollman demonstrated that a definitely diseased gallbladder does not invariably lose its capacity of concentrating the dye, and that there is no constant relation-

ship between the degree of concentration of bile and that of the cholecystographic medium. Kirklin has repeatedly pointed out that the greatest number of diagnostic errors occurs in the group of cases in which a normal cholecystographic response was elicited, but in which cholelithiasis was found at operation.

Perhaps the most valuable aspect of the normal cholecystographic response is the facility with which it reveals the presence of gallstones. Depending on their calcium content, stones produce areas either of increased or diminished density in the shadow of the gallbladder, and are usually quite obvious. Occasionally, however, the evidence of cholelithiasis is so slight that it can be discerned only by most careful scrutiny.

It has become obvious to me that cholecystography, perhaps more than any other roentgenologic procedure, is out of place in the hands of those who are either unwilling or unable to devote most scrupulous attention to technical detail. This care begins with the administration of the cholecystographic medium, continues with the direction of the patient throughout the time required for carrying out the test, implies individualization of each patient, and ends only when the observer has satisfied himself that the test has been extended to its full capacity.

When consideration is taken of the rather wide gaps in basic knowledge concerning the functional and anatomic changes of the gallbladder in disease, it is a matter of wonder not so much that the procedure is sometimes in error, as that it is so rarely wrong. In evaluating cholecystography, the high efficiency of the clinical diagnosis of cholelithiasis must be kept in mind. In the frank case, cholecystography is corroborative; in the more obscure case it is directive, occasionally perhaps determinative. At all events, it is a laboratory procedure, and as such should

not be relied on without other data to affirm or deny the presence of cholelithiasis. Rather let the family physician or the clinician collaborate with the roentgenologist, collect all available information, and estimate the probabilities of disease and its gravity.

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THE INDICATIONS FOR AN EXAMINATION OF THE COLON*

EDWIN L. GARDNER, M.D.
Minneapolis

THE mechanism producing gastrointestinal symptomatology usually cannot be attributed to one offending organ alone. An abnormal function of the stomach, or of the liver, or any other part of the gastrointestinal tract is likely to affect the activities of the entire digestive system. This is noticeably true in disturbances of the colon. In order to simplify and coordinate our knowledge, we should be reminded of several fundamental physiological principles of colonic function.

1. The colon is embryologically, anatomically, and functionally two distinct organs. The proximal colon is a thin walled, easily dilatable organ for the absorption of fluids and their dissolved contents, as well as an organ of propulsion of liquid or semi-fluid material; while the distal colon is essentially an organ of elimination, as shown by its stronger musculature, greater tonicity, and greater capacity for vigorous mass peristalsis.

2. The colon is a non-striated muscular tube, whose activities obey the laws affecting involuntary muscle, but with certain adaptation for function. Non-striated muscle responds to tension by contraction, but in the case of the colon, adaptation has normally produced a marked refractory stage after massive peristalsis, lasting 6 to 24 hours, during which stage of fatigue the musculature is comparatively insensible to stimuli for massive contraction. It follows, then, that the normal colon does not show vigorous peristaltic waves, except when influenced by vigorous stimuli such as extend down the digestive tube after the taking of food, or especially upon arising in the morning after a good night's rest. It is this massive peristalsis which forces the stool into the lower sigmoid and rectum. The rectal tension in turn stimulates the defecation reflex. Normally, the rectum is empty, or nearly so, during the greater portion of the twenty-four hours.

3. The motor function of the colon depends upon the balance between peristalsis, on the one

hand, and the resistance of muscular tonus on the other. The colon always contracts upon its content, whether it be air or fecal matter. According to the law of "postural tonus," it may contract still further, whether in a resting, contracted or dilated state. In a habitually contracted colon, such as occurs in chronic diarrhea or after the habitual use of cathartics, the stimulus produced by very slight distension may initiate active contractions, while in conditions associated with colonic dilatation only a large bowel content will stimulate motor activity. Whether the bowel is contracted or dilated, it responds to tension by contraction.

4. The digestive tube, like the heart, is autonomous; and the nervous system is essentially a regulator of muscular and secretory function. Through the influence of the nervous system, the digestive tube's irritability and threshold for receiving stimuli are greatly influenced.

5. Distress or pain from the colon is an expression of motor function, *i.e.*, tonus and peristalsis. Pressure of the palpating hand over the colon causes increased tension with resulting discomfort in sensitive cases. Stimuli may be referred to other portions of the digestive tube, either through direct extension from muscle fibre to muscle fibre, or indirectly, through the nervous system. Those symptoms arising from peritoneal irritation or from tugging on the mesentery result from an entirely different mechanism.

6. In spite of much propaganda to the contrary, the colon does not normally completely empty itself every twenty-four hours. A barium meal in the average normal is eliminated in forty-eight to seventy-two hours, and there is abundant evidence to show that the bowel, like the stomach, has a selective action on the foods which it eliminates. It has been shown that certain food residues, or small glass beads fed to healthy medical students, may not be expelled from the rectum until a period of 7-10 days has elapsed. All evidence would indicate that the average normal individual on an average diet will

*Read before the annual meeting of the Minnesota State Medical Association, Minneapolis, May 5, 1931.

have one formed stool per day, or possibly two, and that more frequent, mushy stools are the exception, rather than the rule. Normally, there is a great variation, depending upon diet and habit, and perfectly healthy individuals may, without harm, go several days with no stool. The rule often prescribed in "health literature" and broadcast to the public, that "three stools per day, one after each meal, is advisable for health" is ridiculous and likely to make semi-invalids.

What symptoms should direct our attention toward the colon? The patient may have some definite complaint beginning at some definite time, with remissions, or a definite progressive course, in which case the symptoms usually indicate some organic disease. But more often the abdominal symptoms are more or less bizarre and confusing upon first impression, and lead the examiner astray.

A careful history often gives a clue to the cause of the disturbance. The primary symptom or syndrome should always be carefully sought. In many functional colonic disturbances there is a history, dating from childhood or puberty, of either irregularities of evacuation, or, what is especially important, upper or general abdominal symptoms which are relieved or modified by evacuation of the bowels. A family history of chronic dyspepsia of a similar nature, or of migraine, is reassuring of a probable constitutional tendency to colonic disturbance.

As the years go by, the digestive tube may become more irritable and in sequence other symptoms develop, until at the time the patient appears for examination the secondary "spill-over" symptoms may off-hand resemble gallbladder, gastric, or other digestive disease. A careful analysis will again show the relation of symptoms to bowel function, and in the functional cases to fatigue and emotional states.

Pain is the most frequent symptom which causes the patient to consult the physician. The pain, caused by motor disturbances of the colon as a whole, varies from a sense of pressure to severe colic, and is frequently diffusely referred to the abdominal wall just below the navel. The pain may be related to evacuation of the bowels, and is often relieved by the passage of a good stool. It more likely occurs at those times when the colon is most active, namely, after the taking of foods, early in the morning before or upon arising, and after excitement. Localized areas of

increased intracolonic tension or peristalsis may cause pain over other areas of the abdomen. A vigorously contracting cecum and ascending colon may be painful enough to cause syncope, and is likely to be associated with nausea and vomiting. In congenital hyperdescent of the colon, where the cecum lies low and is fixed in the pelvis, or when the cecum is bound down by bands or adhesions, paroxysms of pain may be unusually severe. These attacks may be confused with many abdominal lesions, but may be diagnosed by the fact that unless obstruction is present they are quickly relieved by bowel evacuation (as by a warm enema), and very often by belladonna. The giving of a large test enema may reproduce the patient's symptoms by increasing intracolonic tension.

Pain or distress arising from the sigmoidal region is likely to be referred to the rectum and lower sacral region. Pain arising about the flexures may be referred to the upper abdomen or thorax because of the close relation of the colon at these points to the innervation of the lower thoracic segments. Here again should be studied the relation of pain to colon function and its relief by the release of intracolonic tension. Only in an almost complete obstruction does the enema become ineffectual. Pain of various types may reflexly be produced in other organs, but the fact that it comes later in the history than the primary colonic complaint, or is related to colonic function, is sufficient evidence to make its source obvious.

The examination of the stools often furnishes important evidence of a colonic disturbance. Stools which are regularly normally formed, of good size, free from excess of mucus and free of blood (chemical and gross), are very good evidence that no troublesome colonic dyscrasia, either organic or functional, is likely to be present. No one single examination is as important as repeated observation of the stools to exclude colonic diseases. In the absence of bleeding hemorrhoids and fissures, or lesions of the stomach (and swallowed blood must be excluded), the constant presence of occult blood means either an ulcerated mucosa or some bleeding neoplasm. Carcinoma of the cecum may not be evident upon physical or X-ray examination and still cause extreme grades of secondary anemia. Diverticulosis is not associated with the constant presence of occult blood in the stools.

A history of progressive constipation with small pencil or ribbon-like stools indicates the necessity of a careful examination; and a chronic or recurrent diarrhea always requires further study.

An abdominal examination may disclose signs which require further elucidation. Visible peristalsis in the terminal ileum and an occasional slow contraction in the proximal colon is always suggestive of obstruction lower down. Excessive rumbling is common in fermentative dyspepsia, or in narrowing of the lumen. Abdominal distention may be due to a megacolon, gas from obstruction or fermentation, and to fluid from peritoneal exudate. A large cystic mass in the lower right abdomen which contracts under the palpating hand may occur in organic obstruction further down, and very often may be due only to a functionally spastic colon. Inflammatory masses are found in the region of the cecum and about the sigmoid, those in the latter location being most commonly due to inflamed diverticula; and these are usually hard and tender. Neoplasms may be felt anywhere along the course of the colon, but in the cecum and ascending colon may be advanced when the patient comes for examination, because of the easy distensibility of the bowel in this location, and because of the tendency to early ulceration, thereby preventing an early obstruction. In the distal colon obstruction is more likely to develop early in the disease.

Tenderness in colonic disease may be present along the course of the colon anywhere in the abdomen, which is in contrast to the symptom "pain." Frequently, it is present in the region of the cecum, but even more commonly over the descending colon in the lower left abdomen. Secondary symptoms elsewhere in the abdomen may be stimulated by pressure over a portion of the tender colon.

The term "autointoxication" is often applied to a group of general symptoms attributed to constipation and supposed to be due to absorption of some chemical poison. If this symptom-complex is always due to poisons, how can we explain their almost immediate disappearance after stool evacuation? Mechanical distension, with air or dilatable rubber bags, of the rectum or lower sigmoid may in many cases produce the signs of "autointoxication" which immediately disappear as the pressure is released. Observation, therefore, shows that tension in the bowel may produce these symptoms, and none of these

hypothetical poisons have actually been demonstrated, although suspected in the occasional case. "Autointoxication" calls for a careful study of colonic motor function. Contents of the proximal colon if in a too liquid state, and if delivered to the colon by the small intestine before proper digestion has taken place, are more susceptible to bacterial action, which may result in the formation of chemical substances more readily absorbable in the excessive fluid medium. Many patients with the chronic irritable bowel, with or without spastic constipation, show excessive small intestinal hypermotility and comprise a group of cases with the autointoxication symptom-complex. No doubt, many of the symptoms in these irritable cases are a reflex expression of abnormal motor function, or increased susceptibility of an irritable nervous system to normal intestinal stimuli.

A detailed sequential history, a careful physical examination, and inspection of the stools (with a chemical test for blood), is usually enough to make a probable diagnosis, and most commonly is sufficient to exclude serious disease, but many cases require a proctoscopic and X-ray examination. An important practical suggestion is that both the proctoscopic examination and the X-ray clyster should be made without a previous cathartic or enema because of the extreme irritability and mucosal congestion which both produce for nearly twenty-four hours. This first procedure may be checked after thorough elimination, but is rarely necessary, and often the picture is confused by the preparation. In every patient a careful general examination should be made, and, when indicated, the entire gastrointestinal tract should be investigated.

SUMMARY

1. Abdominal symptoms, exaggerated or relieved by bowel evacuation, especially if increased by stimulating foods, chilling of the body or emotional strain, require a careful examination of the colon.

2. Colonic symptoms due to organic disease usually have a definite onset, accurate localization, and a progressive course. The symptoms of functional disturbances may have a life-time history; the symptoms are variable and often bizarre, usually not progressive, but exaggerated by dietary indiscretions and nervous and emotional influences. If the symptoms are due to

some general disease, their course bears a close relation to the course of the basic disease (tuberculosis, cardiorenal, anemia, etc.).

3. Unexplained blood in the stools always requires a careful examination, and unexplained anemia may be due to symptomless carcinoma, especially of the cecum.

4. A progressive constipation or diarrhea always requires a careful study of the colon and the stools.

5. Any abdominal complaint with an obscure or atypical history or unusual symptoms demands a careful colonic examination as a part of a general thorough abdominal investigation.

USE OF CINCHOPHEN AND NEOCINCHOPHEN

In consideration of reports of untoward effects, it would be well to discontinue the use of cinchophen and to substitute neocinchophen for it. Even though neocinchophen owes its activity to cinchophen, it is so slightly soluble as to be almost tasteless, devoid of irritant action on the stomach, and of remarkably low toxicity. If cinchophen is prescribed it should be under its pharmacopeial name and not as "Atophan," which is more expensive and is marketed with unwarranted claims. If neocinchophen is wanted it should be prescribed under this name and not under the uninforming designation "Tolysin." In view of the serious though rare poisoning from ordinary doses of cinchophen, the use of this drug should be restricted as much as possible to cases in which other non-narcotic analgetics, such as salicylates, acetylsalicylic acid or amidopyrine, have been tried and failed to give adequate relief, and in which the suffering is sufficiently great to justify the risk. (Jour. A. M. A., August 8, 1931, p. 409.)

THE KAADT DIABETES TREATMENT

Reports are being received that a diabetic treatment is being sent out by the Diabetic Laboratories of Fort Wayne, Indiana, the material as sent to the patient by this concern being signed by C. F. Kaadt, M.D. A quart bottle of the medicine is sold for five dollars, and the patient is asked to disregard the testing of urine for sugar. A request sent to Dr. Kaadt by the American Medical Association Bureau of Investigation, requesting that he declare the composition, did not bring this information. Instead, it appeared by the reply that while Dr. Kaadt is willing to let laymen infer that he has a cure for diabetes and sells this remedy on the mail-order plan, telling diabetics that when using it, it is unnecessary for them to use insulin or diet, he is, as yet, unwilling to give the medical profession any information on the subject. This, in spite of the fact that he admits that he has used his remedy for nine years and that he has never failed to produce a cure. (Jour. A. M. A., August 15, 1931, p. 479.)

INDICATIONS FOR SPINAL PUNCTURE*

HENRY W. WOLTMAN, M.D.
Rochester, Minnesota

THE most common purpose of spinal puncture is to obtain cerebrospinal fluid for examination. It is not indicated until the physician has some idea of what he is looking for, whether change in color, cytologic change, change in chemical composition, organisms, or hydrostatic changes. The inference is clear; examination of the fluid should be complete and a neurologic examination should precede the puncture. One should know beforehand whether or not the optic disks are choked, since presence of this phenomenon constitutes a warning that a situation exists in which puncture is not always safe.

At the head of the list of indications for spinal puncture I should place suspicion of poliomyelitis or of epidemic meningitis. In children, the ordeal will be made less trying by preliminary administration of a small dose of a sedative such as sodium *iso*-amylethyl barbiturate (sodium amytal). The seasonal incidence and the presence of epidemics aid in making a decision, and the urgency of early treatment justifies the procedure.

Symptoms suggestive of meningeal irritation, such as headache, backache, reflex spasm of the nuchal muscles on flexion of the head on the thorax, and a positive Kernig's test, whether or not accompanied by fever, in the absence of choked disks, and often an adequate period of observation, usually justify spinal puncture.

A cloudy fluid generally indicates that some organism is at work; cultures and smears should be prepared and carefully studied. Tuberculous meningitis is usually suggested by the clinical course, pleocytosis and low values for chlorides in the fluid. The diagnosis is verified by demonstration of *Mycobacterium tuberculosis* in the fluid. Actinomycotic meningitis, which is seen from time to time in rural communities, frequently displays surprisingly few signs of meningeal irritation, although the pus mixed with the spinal fluid may be so thick that suction is required to obtain it.

Suppurative otitis media is always followed

apprehensively, and when signs of intracranial extension occur, puncture is usually indicated. Pus in the spinal fluid, without organisms, is not infrequently encountered; this situation is not always so grave as might be anticipated. When Queckenstedt's sign, making pressure on each side separately, is employed to assist in the diagnosis of sinus thrombosis, one must bear in mind that a response on unilateral pressure, particularly on the left side, is often absent normally, as first pointed out by Ayre.

Puncture is to be avoided, as far as possible, when one is dealing with an abscess of the brain; there is always danger of extension or rupture of the abscess. It is sometimes impossible to tell, however, whether an abscess is sufficiently mature to be operated on. Puncture may then be performed, removing as little fluid as possible. If polymorphonuclear leukocytes predominate, operation usually proves fatal, but if lymphocytes predominate, the outlook is relatively good.

Spinal puncture is usually indicated when there is evidence of progressive impairment in function of intracranial and intraspinal structures, such as one or more of the following: paralysis of cranial nerves; root pains; disturbances of pupillary, tendon and plantar reflexes; hemiplegia; aphasia; apraxia, and finally dementia, particularly in younger persons when coupled with signs which suggest organic involvement of the brain. An observation made in 1814 by Esquirel is still helpful: "In dementia a tremor of the lips is a fatal sign." Examination of the spinal fluid is most helpful in establishing the diagnosis of dementia paralytica and as a guide in the proper use of treatment by malaria. In multiple sclerosis, marked changes in the spinal fluid are usually adequate grounds for instituting active treatment, such as administration of typhoid vaccine. When mental and cerebral symptoms are accompanied by fever of obscure origin, spinal puncture usually is justified.

Comatose states occasionally present knotty problems in diagnosis. A glance at the spinal fluid may reveal the cause. The spinal fluid of patients who have syphilis should be examined

*From the Section on Neurology, The Mayo Clinic, Rochester, Minn. Read before the Minnesota State Medical Association, Minneapolis, May 5, 1931.

within six months of the onset of the disease. A norm for these patients is thus established. Subsequent punctures should be made to determine whether the disease has invaded the nervous system, and, if it has, to determine the trend of the disease.

In transverse lesions of the spinal cord, roentgenographic study usually provides any reason there may be for not examining the spinal fluid. Complete data, particularly the character of the response on jugular compression, and estimation of the content of protein, should be made; otherwise the puncture may have to be repeated. In fracture of the spinal column if displacement is not so great that section of the cord is a foregone conclusion, demonstration of subarachnoid block is of assistance in deciding whether or not laminectomy should be considered.

Any deviation from the usual course of sciatic neuritis, particularly bilaterally, is an indication for spinal puncture. A "dry tap" in the hands of a skilled technician usually means that a tumor has filled the canal.

The last reason for diagnostic puncture I shall merely mention, namely, that of injecting air or roentgenologically opaque mediums. The selection of cases for such procedures should be left to the expert, since the procedure may be

harmful, and since special experience is required both in the doing of these tests and in interpreting the results.

It need hardly be said that spinal puncture is a method by which serums, anesthetics, various dyes, and salvarsanized serums are administered. Introduction of salvarsanized serums is usually indicated in treating asymptomatic syphilis, when other methods of treatment have failed.

A useful therapeutic procedure is spinal drainage. This is usually indicated in treatment of meningitis; it provides a means of removing blood from the subarachnoid space, and may be a valuable aid in the treatment of uremic coma, malignant hypertension, status epilepticus, and delirium tremens.

I have purposely refrained from numerous temptations to go afield in the consideration of this subject. The various indications I have cited so briefly are not all of the indications, and they are subject to exceptions. To perform a spinal puncture without having preceded it by neurologic examination is a mistake. The indications will occur to every physician if he will interest himself in neurologic diseases; he can often tell what is wrong with a patient's nervous system even though he cannot attach the orthodox and unessential name to the disease.

PRESIDENT'S LETTER

A RECENT Associated Press story reports that the mails are being deluged, these days, with advertising of quacks, cultists, and medical fakes. Postal authorities are seriously taxed to trace and bar the most flagrant offenders. Physicians certainly should be interested.

No doubt this unusual activity is a sign of the times. It may be that business is not so good as it might be with this infamous gentry. On the other hand and by the same token, it may be that business is thriving. Perhaps the gullible become more gullible instead of less in times of uneasiness and want.

It is a curious quirk every physician has had to reckon with that people who complain the loudest about the legitimate bill of a regular practitioner are likely to be the first to give cash in advance to a fake.

In any case, the presence of an epidemic of so grave a disease as poliomyelitis presents a serious complication in dealing with the quack problem.

In the face of an already established paralysis the physician can offer nothing immediate or spectacular in treatment or hope of recovery. Recovery will depend upon long, tedious, disheartening regimen with no certain prospect of full recovery at the end. And a whole school of fake healers has armed itself almost over night to take advantage of the situation.

For instance, a self-styled "clinic" with headquarters in a neighboring state is very thoroughly canvassing Minnesota sufferers from the disease just now. This clinic is composed of a half dozen men, none of whom is a registered physician. They operate an "institute" with their clinic and they draw an every-growing clientele in Minnesota and the Northwest. Some live within an hour's ride of the Eustis Hospital for Crippled Children at the University of Minnesota and of the Gillette State Hospital, among the finest institutes of their kind in the United States for the care of crippled children. Admittance to these institutions is free to those who cannot afford to pay. Needless to remark, admittance to this "clinic" and institute is not free nor even moderately priced for anyone, though the price in cash that victims must pay is of no importance at all beside the tragic price in hopelessly crippled bodies.

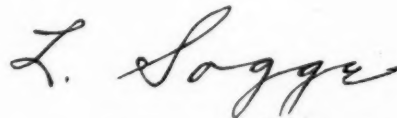
This criminal assault upon the ignorance and anxiety of the families of "polio" victims is much more smooth and insinuating than that of the blatant old fashioned fake. Nowadays Dr. "Curem" is head of a "famous clinic" and, no matter what the misused word "clinic" may mean to the profession, to the gullible public it conveys an idea of scientific mystery and professional repute. Furthermore, Dr. "Curem" says, in a vague grandiose manner, that he is a member of "many learned societies" and to the large number of persons who still do not understand the significance of a County Medical Society roster or an American Medical Association directory, that suffices.

The responsibility for combating this sort of thing rests upon the medical profession and with it, of course, the schools, the church and public health agencies. But the medical profession must lead.

In spite of its long and brilliant public service in improving and standardizing hospitals and medical education, organized medicine has still to educate the public on what it means to be a licensed physician.

The same public that demands certificates of a proper education from its teachers still accepts self-styled doctors without certificates for its healers.

It is a challenge, not only to the private well-being but to the public conscience of the licensed physician, and organized medicine must meet it.



President,
Minnesota State Medical Association.

EDITORIAL

MINNESOTA MEDICINE

Official Journal Minnesota State Medical Association,
Southern Minnesota Medical Association, Northern
Minnesota Medical Association, Minnesota Academy of
Medicine, and Minneapolis Surgical Society.

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Vol. XIV November, 1931 No. 11

THE POLIOMYELITIS SITUATION

Minnesota is still in the midst of an epidemic of poliomyelitis which is almost nation-wide. The New England states and New York have especially suffered and Minnesota has had more cases in proportion to population than her neighboring states. The State Board of Health reports 636 cases with forty-three deaths this year up to October 15, thirty cases and six deaths having been reported the first six months of the year.

The epidemic first made its appearance in and around Duluth the last of July, although there were more than the usual number of sporadic

cases in the state during the first half of the year. The following figures show that the epidemic reached its height at Duluth in August, at Saint Paul in September, and apparently somewhat later in Minneapolis.

	Duluth	Saint Paul	Minneapolis
July	11 (2)*		
August	44 (3)	38 (3)	21
September	29	120 (7)	25 (3)
October 1-15	5	30 (3)	25

*Bracketed figures represent deaths.

Scattered cases have been reported from all over the state, few counties having escaped. The weekly totals were higher the first week in October than many preceding weeks. From the standpoint of the appearance of first symptoms, however, it is quite probable that the peak of the epidemic in the state was reached about the first of October.

The mortality of the epidemic so far has been about 6 per cent and is lower than that for the sporadic cases reported during the first half of the year. The explanation may be in the fact that more mild cases are overlooked in the absence of an epidemic. It is not an unusual experience to elicit histories of illnesses which must have been mild attacks of the disease in other children of a family with perhaps one child paralyzed.

At this time it is impossible to state what percentage of the cases reported had no paralysis but it is safe to say it will be considerable. Muscle paralysis, or weakness, loss of or diminished reflexes are usually rather definite. Stiff neck, fever and increased cell count in the spinal fluid is generally recognized as indicative of the presence of poliomyelitis. There are certainly borderline cases which are impossible to diagnose.

The use of convalescent serum seems to be the only generally accepted specific method of treatment. Dr. McKinley's proposal for the wholesale immunization of children in the presence of an epidemic, the details of which were presented in an article in the October number of MINNESOTA MEDICINE, has attracted considerable attention. The technic outlined is rather impracticable, especially in the territory outside of the

larger cities. Traveling units from the State Board of Health with the necessary equipment are expensive and the demand for such service would all come at about the same time.

It does seem as though a demonstration of the value of the method in selected smaller communities during a widespread epidemic would be decidedly worth while. If the results showed the production of a passive immunity of long enough duration and a simpler technic to be just as efficient, the method could be put into general use.

Some day the etiological organism in poliomyelitis will be discovered. Then the hope of prevention will lie in universal immunization through vaccination.

MORE HUMANISM IN MEDICAL SOCIETIES

We quote from the Valedictory Address of the retiring president of the Hennepin County Medical Society, Dr. Stephen H. Baxter, which appeared in the Bulletin of that Society of October 10:

I would like to suggest that we put a little more humanism into our Society. It ought to be more than an organization to which we pay, under a certain amount of compulsion, certain dues; whose meetings we attend, in a perfunctory way, once a month. It ought to be a place where animosities can be broken down, jealousies forgotten, personalities overlooked,—where all can unite for the welfare of our profession, and in so doing we will best be serving our own personal interests and those of the public. In the direction of putting more humanism into the Society, I would like to have the scope of some committee (possibly the Entertainment Committee) enlarged so that one of its functions would be to make personal contacts, in the name of the Society, with members who are sick. According to our present practice, the names of members who are sick, and who may be permanently incapacitated, may be dropped from the rolls after receiving a certain number of notices of delinquency. True, members who are permanently disabled may "at their own request" become emeritus members, but who would want to be an emeritus member of a Society that took no cognizance of his misfortune except "at his own request"? Certainly, one of the functions of our Society, if it is to perform its full ethical obligation, is to show a little human interest in its members without waiting until they are totally and permanently disabled or are threatened with expulsion for non-payment of dues.

I would suggest, also, that the names of members who have attained the required age and years of mem-

bership in the Society be automatically transferred to the list of emeritus members, and that a letter be sent to such members notifying them of this action and stating that it is done as a mark of honor in recognition of long service. Would this not be a friendly gesture toward our older members more becoming a Society like ours than to require that such recognition be given "at their own request"? Then let them continue as active members at their own request, which, doubtless, some of them would elect to do.

The proposal is so well put that comments are rather superfluous.

A case in point. A physician died recently at the age of seventy-five, having been a member of his local county society some twenty-three years. Perhaps because of ill health or declining practice or both his name was on the list for reinstatement since he had previously been suspended for failure to pay his dues. Before he was reinstated he died. A committee such as Dr. Baxter suggests ought to have humanized his society relation a bit. Surely society membership should mean much more than the phrase in one's obituary notice, "He was a member of his local county society."

OUR ERROR

In the last issue of MINNESOTA MEDICINE the opinion was twice expressed (two errors) that the A. M. A. Directory might add to its value if more complete. The inquiry was made from headquarters—how? Upon careful investigation of the data given in the Directory and comparison with other directories, which, by the way, are few in numbers, we are forced to admit that the additional information contained in other directories, even at twice the price, is non-essential. One of these carries the list of scientific publications, undergraduate fraternities, et cetera, the inclusion of which in the already large A. M. A. Directory would be prohibitory.

We imagine that we were not alone in our lack of appreciation of the actually extensive amount of information about ourselves which this volume contains. The interpretation of the system of symbols employed is not very difficult but does require a little concentration. This method keeps the volume down to a manageable size. It contains information about all physicians who have been licensed and not just the best of us according to some layman's opinion. The

data are as reliable as is humanly possible and are made up-to-date every two years.

Our apologies are tendered the editors of this remarkable volume and we admit we have no constructive criticism to make.

There—we feel better.

OBITUARY

Albert Kumpf

1901-1931

Dr. Albert Kumpf, formerly of Minneapolis, died Monday, October 12, at his home in Hot Springs, South Dakota.

Dr. Kumpf was born at New Hampton, Iowa, and had lived in Minneapolis for eleven years before making his home in South Dakota last year. He was a graduate of the medical school of the University of Minnesota and had served there as an instructor for three years after his graduation. He was a member of Alpha Omega Alpha, honorary fraternity, and of the Trinity Lutheran church.

Surviving are his wife, his parents, Mr. and Mrs. Louis Kumpf, and a sister, Elizabeth, all of Minneapolis.

Silas E. Brown

1856-1931

Dr. Silas E. Brown, 75 years old, a physician and surgeon in Saint Paul more than twenty years, died Saturday, October 10, 1931, at his home in Saint Paul after a brief illness. He died in active practice, as he wished. On the Wednesday preceding his death he gave medical testimony in court for an hour and had scheduled himself to see patients on the following four days.

Dr. Brown was born in Heuvelton, N. Y., February 24, 1856. He received his early education in local schools and at the Pottsdam, New York, Normal School. He began his medical studies at McGill College, Montreal, where he was a student under the famed Sir William Osler. He told of how Sir William used to make him and his fellow students shed their coats and go to work at the city morgue, lecturing as they performed autopsies. After his second year at McGill he transferred to New York University Medical School, where he was graduated in 1883.

For twenty-five years he practiced in Ogdensburg, N. Y. He was appointed by the United States government as marine surgeon and United States health officer in 1884, and coroner of St. Lawrence County in the same year. In these capacities he served for twenty-five years before moving to St. Paul. While in Ogdensburg he was also president of the St. Law-

rence County Medical Society and of the Northern New York Medical Society. He was lecturer for the St. Lawrence State Hospital for the insane and examiner for various insurance companies. After moving to St. Paul he was appointed railway surgeon, and examiner for several insurance companies, was a member of the Minnesota Medical Society and the Ramsey County Medical Society. He was a Mason and an elder in the House of Hope Presbyterian Church.

Surviving are his widow, Mary Macon Brown, and two daughters, Josephine Brown of New York, staff secretary of the National Family Welfare Association, and Marion Brown MacLean of Milwaukee.

Soren P. Rees

1870-1931

Dr. Soren P. Rees, physician and surgeon, died Friday night, October 2, 1931, at his home, 1715 West Franklin avenue, in Minneapolis, following an illness of three months. He was 61 years old.

For a number of years Dr. Rees was a member of the faculty of the medical school of the University of Minnesota, and had been a member of the staff of Swedish hospital since that institution was founded. He was chief of medicine on the staff of General hospital for some time.

Dr. Rees was born September 27, 1870, at Vejle, Denmark. When a boy of eleven, he was brought to the United States by his parents, who established residence in Stillwater, Minn., in 1881.

He matriculated at the University of Minnesota in 1890, and entered the medical school in 1895, being graduated with the class of 1897. Until June of 1898 he served his internship at St. Barnabas hospital. Dr. Rees completed one year of postgraduate work in Vienna. He then entered the practice of medicine at Anoka, Minn. In 1901 he moved to Minneapolis and opened an office. While a student at the university, he was assistant registrar under E. Bird Johnson. When later he became a member of the faculty he gave instruction in physical diagnosis.

Dr. Rees earned his own living while attending both high school and the university and was graduated with honors as a member of Phi Beta Kappa, national honorary scholastic fraternity, and the medical fraternity of Phi Beta Pi. He also was a member of Theta Delta Chi, national academic fraternity, of which he was a charter member at Minnesota.

Dr. Rees was a member of the Hennepin County Medical Society, the Minnesota State Medical Association, the Minnesota Academy of Medicine and the American Medical Association.

Aside from his professional work he was interested in the fine arts. He was a life member of the Minneapolis Institute of Arts, and was a founder and secretary of the Scandinavian Art Society of America. He was a deacon of Trinity Baptist church.

Surviving him are his wife, Estelle Crocker Rees, whom he married in 1898; a son, Douglas, and a sister, Mrs. Clara Anderson, of Stillwater.

A FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

The energy and ambition of the Women's Auxiliary to the State Association is obvious in the very complete and thoughtful supplement now under discussion in Minnesota to the Official Health Program of the Women's Auxiliary to the American Medical Association.

Where the national program, outlined on this page last year, indicated broadly the part of the Auxiliary in the important business of Public Health Education, this state supplement is specific and definite. Minnesota women propose to know with great minuteness the problems of the medical profession in this state and their own part in solving them. If the study is carried on as intelligently as it is begun in this outline, women of the auxiliary should be better equipped than many of the physicians whose problems they are studying to assist with the business of public health education by the physician.

Following are the high points in this outline:

THE COMPONENT AUXILIARY:

1. County Medical Society Advisors
2. Joint Meetings
3. Joint Programs

STATE HEALTH RELATIONS:

Dangers of State Medicine

1. In Other Countries—Europe-Canada, U. S.

2. Legislation leading to
Current Literature
Cost of Medical Care

- (a) Physician
- (b) Nurse
- (c) Patent Medicine
- (d) Laboratories
- (e) Druggists
- (f) Health Insurance

3. Public Health

- (a) State
- (b) County
- (c) City Dept.
- (d) National Committee
- (e) County Health Unit
- (f) School Nurse
- (g) School Health

4. Relation of County Medical Society and Its Members

PUBLIC HEALTH EDUCATION:

1. Official and Voluntary Health Agencies
2. Contact with Lay Health and Civic Organizations
3. Immunization
 - (a) Minnesota Plan
 - (b) In other States
 - (1) Smallpox
 - (2) Vaccination
 - (3) Diphtheria
 - (a) Our campaign
4. Pre-school Child Examinations
5. Parent-Teacher Associations
 - (a) Purpose and Plan
6. Examination Given by Family Physician
7. Follow-up for Correction of Remediable Defects
8. Health Campaigns:
 - (a) Heart
 - (b) Tuberculosis
 - (c) Crippled Children, etc.
9. Period Health Examinations:
 - (a) Every Member Should Have an Annual Physical Examination

- (b) Importance of Early Discovery of Disease:

- (1) Cancer
- (2) Heart
- (3) Tuberculosis, etc.

10. Medical Ethics

- (a) The Medical Society and Auxiliary
- (b) The Physician
- (c) The Physician's Wife

11. Medical Legislation

- (a) National:
 - (1) Jones-Cooper Bill
 - (2) Sheppard-Towner
 - (3) Vivisection
 - (4) Cultists
 - (5) State Basic Science Law
 - (6) New Medical Practice Act, etc.
 - (7) 1931 Recommendations for Northwest Regional Conference.

As Auxiliary members we should be interested in the following topics, and study them—

STATE BOARD OF CONTROL:

1. Its Functions?

2. Institutions

- (1) Insane Asylums
- (2) School for Feeble Minded—Faribault
- (3) School for the Deaf—Faribault
- (4) School for the Blind—Faribault
- (5) Colony for Epileptics at Cambridge
- (6) Training School at Red Wing
- (7) Home School for Girls—Sauk Center
- (8) Public School—Owatonna

3. Tuberculosis:

Dr. Arnold S. Anderson, Secretary of the Tuberculosis Division, State Board of Control, is available for talks, as are also the various superintendents of the Tuberculosis Sanatoria in the different parts of the State.

4. Crippled Children:

The Gillette Hospital for Crippled Children in St. Paul also comes under the State Board of Control, and members of its staff are available for talks.

In addition there is the Shrine Hospital for Crippled Children and also the Eustis Hospital in connection with the University of Minnesota.

The Crippled Child is receiving much attention from many lay groups. Have you made a study of legislation pertaining to crippled children, also a survey of institutions caring for the crippled child. You may find the subject of vast interest and be

able to do much better work for your clubs and Parent-Teacher Associations if you study the problem from the standpoint of the State Medical Association and the Auxiliary.

MINNESOTA STATE BOARD OF HEALTH:

1. Personnel? How Selected?
2. Functions:
What help should a rural community naturally expect from our State Board of Health?
 - (1) Pure Milk Program
 - (a) Laws Governing the Handling of Milk in Minnesota
 - (b) What is Certified Milk?
 - (c) What is Pasteurized Milk?
 - (d) Do You Know the Story of Tuberculosis Testing of Cows in Minnesota?
 - (2) Sanitation Laws?
 - (3) Water Supply Laws?
 - (4) Communicable Disease Laws?

UNITED STATES PUBLIC HEALTH SERVICE:

1. Personnel? How Selected?

2. Functions?
 - (a) What Help in Auxiliary Work?
 - (b) What is the U. S. Veterans Bureau?

MINNESOTA PUBLIC HEALTH ASSOCIATION:

1. Personnel? How Selected?
2. Duties:
 - (a) What Help in Auxiliary Work?

MINNESOTA STATE MEDICAL ASSOCIATION:

1. Personnel?
2. Duties of Committees?
 - (a) Many Doing Specific Line of Work.
 - (b) Of General Interest to Auxiliary Workers are:
 - (1) Committee on Hospitals and Medical Education
 - (2) Committee on Public Policy and Legislation
 - (3) Committee on Public Health Relations and Education
 - (4) Committee on State Health Relations
 - (5) Heart Committee
 - (6) Committee on Public Health Nursing

The Committees of importance to the Auxiliary under the Minnesota State Medical Association are listed above, and the Chairmen would be happy to explain to the Auxiliaries the functions of their committees.

The office personnel of the Executive Secretary of the Minnesota State Medical Association and the Minnesota Public Health Association at 11 West Summit Avenue, St. Paul, under the personal supervision of Dr. E. A. Meyerding, is ready at all times to help you get your program problems in shape. They will help you select speakers, reading material, and helps of many kinds, on all topics in the foregoing outline.

If as an Auxiliary you meet at the same time as your County Medical Society, it would be wise to select a program chairman from your group, to keep in touch with the program chairman from the Medical Society, and plan to have the speaker for the Doctors' program give the Auxiliary some time, asking him to give you a definite topic. This time can very easily be arranged for while the Medical Society is holding its business meeting.

Many Auxiliary groups are taking topics from *Everybody's Health, Hygeia*, and MINNESOTA MEDICINE, asking members to review them, with an open discussion following.

Dr. Meyerding has a number of books in his office library that would make excellent books to review for Auxiliary programs and folders on three hundred subjects suitable for health talks, are on file. Upon request, material will be loaned to members of the Auxiliary.

FEDERAL SCIENTISTS TELL HEALTH ASSOCIATION OF RECENT FINDINGS

Oranges produced by trees sprayed with lead arsenate not only differ in chemical composition from normal oranges, but suffer a considerable loss of Vitamin C content which is regarded as such a highly desirable constituent of oranges, Dr. E. M. Nelson and Mr. H. H. Mottern of the Bureau of Chemistry and Soils, U. S. Department of Agriculture, recently told members of the American Public Health Association in session at Montreal.

Doctor Nelson's statement followed completion of a series of experiments in the Bureau of Chemistry and Soils which have demonstrated that, besides causing a considerable loss of the valuable Vitamin C, spraying orange trees with lead arsenate reduces the acidity of the juice and decreases the sucrose with a correspond-

ing increase in invert sugar. The principal orange producing States have laws prohibiting the use of arsenical sprays on this crop.

The spraying of oranges with lead arsenate involves no danger from arsenic poison, according to the findings of the bureau, which disclosed no arsenic in the edible portion of the orange following many applications of spray to orange trees.

Another interesting fact brought out by the recent investigation of the Department of Agriculture's chemists which Doctor Nelson announced today is that the processing of oranges, by the heat method of the department's Plant Quarantine and Control Administration, to destroy larvae of the Mediterranean Fruit Fly during the recent eradication campaign against that pest did not change the character of the sugars, citric acid, or Vitamin C content of the fruit.

OF GENERAL INTEREST

A son, James Elwyn, was born to Dr. and Mrs. Elwyn V. Strand, Bayport, Minnesota, on August 16, 1931.

Dr. George E. Malmgren, formerly with the Mayo Clinic, has moved to Los Angeles, where he will practice proctology.

Dr. B. R. Kirklin of Rochester was elected first vice-president of the American Roentgen Ray Society at its recent meeting held in Atlantic City.

Dr. and Mrs. Chester M. Carlaw, Minneapolis, have returned from Montreal, where Dr. Carlaw attended the fortieth reunion of his class at McGill University.

Paul H. Fesler, Superintendent of the University of Minnesota Hospital, was installed as president of the American Hospital Association at its meeting in Toronto, October 2, 1931.

Doctor Russell M. Wilder has resigned his position as Professor of Medicine at the University of Chicago to join the staff of the Mayo Clinic and the Faculty of the Mayo Foundation Graduate School of the University of Minnesota as Professor of Medicine.

Dr. Arthur C. Strachauer and Dr. William R. Jones announce the opening of their offices on October 1, 1931, at 350 Medical Arts Building, Minneapolis, for the practice of general surgery. Dr. Strachauer has recently been appointed Chief Surgeon of the Soo Line Railway.

Dr. Strachauer has returned from the annual meeting of the directors of the American Society for the Control of Cancer, which was held in New York City October 10 to 14; also the annual meeting of the Conference on Cancer Clinics of the American College of Surgeons.

The new Bethesda hospital, Saint Paul, is well on the way toward completion. The \$500,000 building on Capitol Avenue, between Como Avenue and Viola Street is being erected on a hill and will tower high in the air so that it can be seen for miles. No definite date has been set for completing the building.

The Clarkfield Community Hospital, Clarkfield, Minnesota, was dedicated Sunday afternoon, September 27, with appropriate exercises. The building was erected

at a cost of \$15,000 and contains fifteen rooms. Dr. Malvin I. Hauge and Dr. M. M. Hauge of Clarkfield are members of the staff of the hospital.

Kappa Phi chapter of Phi Chi, national medical fraternity, has just opened a new \$40,000 fraternity house at 325 Harvard Street S. E., Minneapolis, for undergraduate members at the University of Minnesota. The building, of the English town house type, was designed by C. P. Pesek. The exterior is of skintled brick with Bedford trim. The Fraternity held an open house in October.

Award to a former St. Paul physician of a gold medal emblematic of first place in a medical essay contest and a cash prize of \$500 was announced Saturday by the Association of Military Surgeons.

The winner is Colonel George A. Skinner of the Army Medical Corps, stationed at the Seventh Corps Area Headquarters in Omaha. The contest, conducted by the association, was for essays on "The Influence of Epidemic Diseases on Military Operations in the Western Hemisphere."

Twenty-four hospitals of the Twin Cities have met the standards required for full approval by the American College of Surgeons, it was announced October 12, by Dr. Franklin H. Martin, director general of the college, at the opening session of the twenty-first annual clinical congress of surgeons in New York.

Of the twenty-four fully approved institutions thirteen are Minneapolis institutions, and eleven are in St. Paul. The Minneapolis hospitals placed on the list are Abbott, Asbury, Eitel, Fairview, Hill-Crest, Lutheran Deaconess, St. Mary's, Shriners' Hospital for Crippled Children, Maternity, Minneapolis General, Northwestern, University and veterans.

St. Andrews, Barnabas and Swedish hospitals, Minneapolis, have been placed on the list as having accepted the minimum requirements laid down by the American College of Surgeons.

St. Paul hospitals fully approved are Ancker, Bethesda, Miller, Children's, Gillette Hospital for Crippled Children, Midway, Mounds Park, Northern Pacific, St. John's, St. Joseph's and St. Luke's.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

LAWYER ARRESTED FOR ALLEGED VIOLATION OF BASIC SCIENCE LAW

State of Minnesota vs. John Hugh Lally

On September 14, 1931, a complaint was filed in the Municipal Court in Minneapolis alleging that one John Hugh Lally had practiced healing without a Basic Science Certificate.

The defendant in this case is a lawyer licensed in

the State of Illinois who has been touring the country giving health lectures and claiming to be engaged in spiritual healing.

Lally was held to await the action of Grand Jury by Judge Wright of the Municipal Court. Following a preliminary hearing his bail was set in the sum of \$1,250. Following Lally's arraignment in District Court, where he entered a plea of not guilty, a motion was made by the defendant to quash the information against him.

On September 28, the date set for the trial, counsel for the defendant informed the Court that Lally had left for Detroit, Michigan.

Judge Guilford ordered the defendant's bail forfeited and a bench warrant issued for his arrest.

Lally has been previously convicted of violating the Medical Laws in Chicago, Illinois, and Winnipeg, Manitoba, Canada.

MINNEAPOLIS WOMAN FINED ONE HUNDRED DOLLARS FOR VIOLATING BASIC SCIENCE LAW

State of Minnesota *vs.* Mayme F. White

On September 25, Mayme F. White, 61 years of age, unlicensed, and living at 512 Forest Ave., Minneapolis, entered a plea of guilty to practicing healing without a Basic Science Certificate before the Honorable Horace D. Dickinson, Judge of the District Court. Mrs. White claimed that she was a Spiritualist and had been practicing magnetic healing. However, in the present case, roots and herbs and some pills had been prescribed for patient. Judge Dickinson imposed a fine of \$100 or ninety days in the Minneapolis Work House, with the defendant paying the fine. The Court also warned the defendant against violating the medical laws in the future. The Court instructed the defendant that the practice of healing was regulated by law and required a license and that she undoubtedly would be prosecuted with more serious consequences for a second violation. The records in the Probate Court disclose that Mrs. White had filed a claim against an estate in the sum of \$167 for services, but the claim was not allowed by the Court.

NEW AND NON-OFFICIAL REMEDIES

The following products have been accepted by the Council on Pharmacy and Chemistry of the American Medical Association for inclusion in New and Non-official Remedies:

ABBOTT LABORATORIES

Neocinchophen-Abbott Tablets, 7½ grains

LEDERLE LABORATORIES, Inc.

Diphtheria Toxoid, two 1 c.c. syringe packages

Diphtheria Toxoid, two 1 c.c. vial packages

Diphtheria Toxoid, one syringe package

Diphtheria Toxoid, one vial package

Solution Liver Extract Parenteral (Lederle)

E. R. SQUIBB & SONS

Diphtheria Toxin for the Schick Test, Ready to Use without Dilution

Scarlet Fever Streptococcus Toxin-Squibb, six 10 c.c. vial packages

Squibb Liquid Petrolatum with Agar and Phenolphthalein

Pentobarbital-Sodium—Sodium ethyl (1-methylbutyl) barbiturate. Sodium ethyl (methylpropylcarbonyl) barbiturate. The monosodium salt of ethyl-(1-methylbutyl) barbituric acid. Pentobarbital-sodium differs from barbital, U.S.P. (sodium diethylbarbiturate) in that one of the ethyl groups of the latter is replaced in the former by a 1-methylbutyl group. The actions and uses of pentobarbital-sodium are essentially similar to those of barbital, but it is effective in smaller doses. The action is of relatively brief duration, which may constitute an advantage, especially when relatively large doses are administered. It is used as a sedative, particularly prior to local, general or spinal anesthesia. It can be used safely for such purposes only by those who have had adequate experience and who are familiar with the literature concerning such use. The drug may be administered by mouth or rectum; intravenous injection is considered unsafe.

Capsules Pentobarbital-Sodium-Abbott, 1½ grains.—Each capsule contains pentobarbital-sodium-N.N.R., 0.1 Gm. (1½ grains). Abbott Laboratories, North Chicago, Ill.

Pulvules Pentobarbital-Sodium-Lilly, 1½ grains.—Each pulvule (capsule) contains pentobarbital-sodium-N.N.R., 0.1 Gm. (1½ grains), and starch, 0.13 Gm. Eli Lilly & Co., Indianapolis, Ind. (Jour. A. M. A., September 5, 1931, p. 705.)

Skiodan.—Methiodal.—The sodium salt of mono-iodo-methane-sulphonic acid. Skiodan contains 52 per cent of iodine. It is proposed as a therapeutically indifferent medium for roentgenography, especially for visualization of the urinary tract, either by intravenous injection or by direct injection into the renal pelvis through a ureteral catheter. It has also been administered rectally. Winthrop Chemical Co., Inc., New York.

Gynergen Solution 0.1 Per Cent.—Each c.c. of solution contains 1 mg. of gynergen (New and Non-official Remedies, 1931, p. 183) and a small excess of tartaric acid. Sandoz Chemical Works, Inc., New York.

Squibb Chocolate Vitavose.—A mixture of Squibb's vitavose (New and Non-official Remedies, 1931, p. 245) 30 per cent, with cocoa, milk solids and sucrose. E. R. Squibb & Sons, New York. (Jour. A. M. A., September 12, 1931, p. 779.)

Scarlet Fever Streptococcus Toxin-Squibb (New and Non-official Remedies, 1931, p. 370).—This product is also marketed in packages of six 10 c.c. vials of toxin containing, respectively, 500, 2,000, 8,000, 25,000, 40,000 and 40,000 skin test doses per c.c. E. R. Squibb & Sons, New York. (Jour. A. M. A., September 26, 1931, p. 930.)

CONSULTATION BUREAU

WM. A. O'BRIEN, M.D., *Director*

Minnesota State Medical Association

11 West Summit Avenue

Saint Paul, Minnesota

1. *Question.*—Please give me some information concerning the present conception of the cause, diagnosis, treatment, and prognosis of hay fever. Many of my patients have asked me about the possibilities of preventing next year's attacks. I would, also, like to know something about perennial desensitization.

Answer.—Both hay fever and asthma are manifestations of a hypersensitiveness to some foreign substance. At the present time, there is a widespread and critical interest in these conditions. This has greatly increased our knowledge of these diseases and has led to marked improvement in treatment. Both are manifestations of what has been variously termed anaphylaxis, allergy, atopy, idiosyncrasy, and the phenomena of hypersensitiveness.

Hay fever is a symptom-complex characterized by red eyes, obstructed nose, paroxysmal sneezing, and nasal discharge of a watery secretion which occurs each year at a definite season and depends upon the fact that the patient is hypersensitive to the pollen of one or more plants which blossom at that time. Allergic coryza is a less specific term, which is ordinarily applied to those patients whose symptoms are not necessarily limited to the summer months but are due to other irritants. Perennial hay fever or chronic vasomotor rhinitis resembles hay fever but is due to a different cause.

Hay fever was the first of the manifestations of allergy to be recognized. It has been known for some time that plant pollens are responsible. The most characteristic feature of hay fever due to pollens is the time of the attack each year. The precise seasons vary with the vegetations of various parts of the country. The usual complaints are located in the nose and eyes. Other symptoms equally characteristic are intense itching of the palate and fauces, a reddish eruption in the mouth, difficulty in swallowing, ear disturbances, including deafness, and asthma. The latter may be considered as an extension of the hay fever process when it occurs only in conjunction with the former disease. It is important to remember that occasionally only isolated features of the hay fever syndrome are present. The seasonal association of even one of these symptoms may be significant.

Pollen is the germ cell of the male plant. Ordinary flowering plants, because of time factors, seldom show self-pollination. Cross pollination is usually effected by insects, birds, and the wind. Ragweed usually has separate male and female plants, the males being more numerous. Most of the grasses and weeds are wind pollinated. Weather has a very important effect upon the concentration of the pollen in the air—rain frees the air of pollen but it makes the weeds grow, and when the sun comes out more pollen than ever is produced. Hay fever is always milder in rainy, cloudy weather. Wind usually increases the symptoms. Patients are usually better in the city than in the country. In any attempt to enforce weed laws, this factor is very important.

Before attempting to get any assistance from the patient's history as to the pollen factor, it is necessary to know the time of pollination in Minnesota. As a general rule, the trees are responsible for the earlier attacks, the grasses for the midsummer disease, and the weeds, notably the ragweed, for the late summer and early fall attacks. Patients frequently state that their hay fever begins on the same date each year. This is of great assistance in making a specific diagnosis. It is interesting that ragweed does not occur in Europe. Travelers returning from abroad during the hay fever season frequently have their first attacks some distance out at sea because of air currents out from shore. Certain sections of the United States are free of ragweed and are sought by sufferers on this account.

There are two ways of finding out the etiology of pollen-sensitive patients, one by skin tests and the other by history. The patient should be treated for that particular pollen which is causing his symptom. Crossed reactions are frequent and skin tests may be positive when the patient is not sensitive. At the present time, no definite method of selection of the proper pollen is satisfactory. Close immunological relationships occur between various grasses and between various weeds. Immunization against one may be effective against others. All of these points are very confusing at the present time and make specific treatment rather difficult. Both pre-seasonal and co-seasonal treatment offer relief.

Symptomatic treatment (nonspecific) includes direct cauterization of the mucous membrane, sprays of adrenalin and ephedrin, cocaine, eye astringents, and general measures. Other drugs which have been used are bromides, acetylsalicylic acid, nitrohydrochloric acid, sodium bicarbonate and ephedrin by mouth, and local applications of radium or X-ray in small doses to the eyes and nose. There is such a great variability in the individual reactions of patients that treatment should be used accordingly. Many milder forms do not require specific treatment. There is a large group, seriously disabled by the disease, and for them specific therapy is not a question of choice but a necessity.

Allergy is usually a hereditary affliction. Very little can be done about this. Dust-free rooms may be developed and are said to be useful. Even a few hours, freedom may induce comfort for the entire day. Some sufferers spend a few hours daily in cold storage plants. The temperature is probably not as important as the poor ventilation in giving relief. Others wear masks. Desensitization is the process by which the reaction of the patient to the defending substance is modified. No treatment could be successful unless the extract used is made from the particular substance responsible. Subcutaneous serial injections are made usually about six to ten weeks before the expected time of appearance. The size of the first dose is based upon the tolerance. The number of doses and the interval

(Continued on page 1019)

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 11:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of November will be as follows:

- November 4—Fracture of Skull.
- November 11—What are the Psychoneuroses?
- November 18—Prevention of Eye Strain.
- November 25—Treatment of Leukemia.

MINNESOTA SOCIETY OF INTERNAL MEDICINE

The semi-annual meeting of the Minnesota Society of Internal Medicine will be held in the Ramsey County Medical Society rooms in the new Lowry Building, Saint Paul, November 1, 1931.

The session begins at 9 a. m. and will be followed by dinner at 6 p. m. at the Town and Country Club, Saint Paul.

Symposia on "Chronic Arthritis" and "Angina Pectoris" are included in a most interesting program.

ASSOCIATION OF RESIDENT AND EX-RESIDENT PHYSICIANS OF THE MAYO CLINIC

Dr. Edgerton L. Crispin of Los Angeles was named president of the Association of Resident and Ex-resident Physicians of the Mayo Clinic and Mayo Foundation at Rochester, Minnesota, Friday, October 9, 1931.

Other officers named are Dr. Clyde Roeder of Omaha, first vice president; Dr. Frank E. McEvoy of Providence, R. I., second vice president; Dr. Thomas J. Kinsella of Oak Terrace, Minn., secretary; Dr. Porter P. Vinson of Rochester, associate secretary and treasurer.

Dr. D. F. Hollenbeck of Rochester was elected to the board of governors, succeeding Dr. Herbert Z. Griffin of Rochester. Other governors are Dr. Frank C. Mann and Dr. Willis S. Lemon, both of Rochester.

Five new members of the advisory board elected are: Dr. L. D. Powell of Des Moines; Dr. Robert E. Moran of Washington; Dr. Carl R. Steinke of Akron; Dr. Eric Larson of Los Angeles, and Dr. Bernard McGrath of Milwaukee.

LYON-LINCOLN COUNTY MEDICAL SOCIETY

At a meeting of the Lyon-Lincoln County Medical Society held Tuesday, October 6, at Marshall, Minn.,

the following officers for 1932 were elected: President, Dr. C. M. Golden, Tyler; vice president, Dr. Archibald Olson, Hendricks; secretary-treasurer, Dr. H. M. Workman, Tracy; delegate to state meeting, Dr. E. T. Sanderson, Minneota; alternate, Dr. A. L. Vadheim, Tyler; censor for three years, Dr. P. E. Hermanson, Hendricks.

The Society is holding a very successful Clinical Course.

RICE COUNTY MEDICAL SOCIETY

Rice County Medical Society met Tuesday, September 29, at 7:45 P. M., in the Faribault Clinic rooms.

Dr. Waltman Walters, of the Mayo Clinic gave a lecture on "Surgical Aspects of Obstructive Jaundice."

C. J. PLONSKE, Secretary.

SOUTHWESTERN MINNESOTA MEDICAL ASSOCIATION

Dr. C. A. Slater, superintendent of the Southwestern Minnesota Tuberculosis Sanatorium at Worthington, was named president of the Southwestern Minnesota Medical Association at a meeting held in Slayton, October 10.

Dr. J. T. Rose of Lakefield is the new vice president and Dr. W. E. McKeown of Pipestone was re-elected secretary-treasurer.

ST. LOUIS COUNTY MEDICAL SOCIETY

At the annual meeting of the St. Louis County Medical Society held recently election of officers resulted as follows:

President, Norven H. Gillespie, Duluth; first vice president, Franklin Raiter, Cloquet; second vice president, O. L. McHaffie, Duluth; secretary-treasurer, M. McC. Fischer, Duluth.

Censors: Dr. A. E. Olson, Duluth; Dr. L. L. Merriam, Duluth; G. C. MacRae, Duluth.

Delegates: Dr. C. L. Haney and Dr. F. J. Elias, Duluth. Alternates: Dr. W. G. Strobel, Dr. W. N. Graves, Dr. Robert S. Forbes, and Dr. L. A. Barney, all of Duluth.

M. McC. FISCHER, M. D., Secretary.

STEARNS-BENTON COUNTY SOCIETY

The regular meeting of the Stearns-Benton County Medical Society was held in Sauk Rapids, September 24, 1931. Dr. H. B. Clark gave a talk on the "Treatment of Syphilis"; Dr. F. J. Schatz reported five cases of Intestinal Obstruction in Infants; and Dr. F. H. Stangl discussed the "Uses of the Drinker Respirator."

WM. H. RUMPF, M.D., Secretary.

WASHINGTON COUNTY SOCIETY

The regular monthly meeting of the Washington County Medical Society was held in Stillwater on September 8, 1931. The business part was taken care of during and after dinner, after which one of our own members, Dr. Carnot H. Sherman, gave an instructive talk. Dr. Sherman has just returned from Philadelphia

where he spent two years at the Post Graduate School, Medical Department, University of Pennsylvania, where he received a diploma as Master of Medical Sciences in Surgery at his graduation, and also captured the place of honor in the class.

The Doctor described the work laid out for the students at this school, the only one in the country barring the Medical Department of the University of Minnesota, that gives advanced degrees in the specialties. The doctor also spoke on new methods of medication and diagnosis, especially emphasizing new ways of lessening error of diagnosis in interpretation of abdominal pains.

It was all very enjoyable and we are glad to have Doctor Sherman with us again.

E. SYDNEY BOLEYN, *Secretary*.

WRIGHT COUNTY SOCIETY

The Wright County Medical Society held its third quarterly meeting at Delano, Minnesota, July 23, 1931, at 3:00 P. M.

Minutes of the October meeting, 1930, the January and April meetings, 1931, were read and accepted except for some corrections added to the minutes of the April meeting.

Dr. J. W. Olson of Cokato was accepted as a member of the Society. In the absence of the president, Dr. Klaveness of Saint Paul occupied the chair. Dr. Klaveness also made a report to the society about the proceedings of the House of Delegates.

Dr. Wangenstein of the University was the main speaker and gave a very interesting and instructive talk concerning "Diagnosis and Treatment of Intestinal Obstruction," illustrating his talk with lantern slides and charts.

A very profitable meeting.

C. L. ROHOLT, *Secretary*.

RED RIVER VALLEY MEDICAL SOCIETY

The Fall meeting of the Red River Valley Medical Society was held at the Hotel Evelyn in Thief River Falls, Tuesday, October 6, starting with a luncheon at 1 o'clock. The program, devoted to the newer phases of tuberculosis, was as follows:

"Discussion of Certain Phases of Tuberculosis," Dr. J. A. MYERS, Minneapolis; Dr. E. A. MEYERDING, Saint Paul; et al.

"Rectal Difficulties in the Tuberculous," Dr. WALTER FANSLER, Minneapolis.

Presentation of cases by members.

B. L. OPPEGAARD, M.D., *Secretary*.

PARK REGION MEDICAL SOCIETY

At a recent meeting of the Park Region Medical Society Dr. M. W. Kemp was elected president; Dr.

O. V. Johnson, vice-president; Dr. E. A. Heidberg, secretary-treasurer. Dr. A. J. Lewis of Henning was chosen delegate to the state convention in Minneapolis.

NORTHWESTERN PEDIATRIC SOCIETY

The Fall meeting of the Northwestern Pediatric Society was held in Duluth on Saturday, October 10, 1931.

Dinner was served at the Kitchi Gammi Club at 7:00 p. m., followed by the scientific program at St. Luke's Hospital as follows:

1. a. "Scleroderma Neonatorum."
b. "Agranulocytosis." Case reports.
DR. C. H. SCHRODER, Duluth.
2. "Pneumothorax; Probable Cyst of the Lung."
Case Report.
DR. C. O. KOHLBRY, Duluth.
3. "Eosinophilia with Splenomegaly." Case Report.
DR. O. W. ROWE, Duluth.
4. "Hypertension in Children and Its Effect on Eyesight."
DR. A. W. GRAHAM, Chisholm.
5. "Meckel's Diverticulum: Report of a Case of Perforation."
DR. R. E. NUTTING, Duluth.
6. "Latent Tetany of the Newborn."
DR. H. A. SINCOCK, Superior.
7. "Breast Feeding of the Newborn."
DR. C. A. SCHERER, Duluth.

ALEXANDER STEWART, *Secretary*.

WOMEN'S AUXILIARY Minnesota State Medical Association

President—Mrs. James Blake, Hopkins
Chairman Press and Publicity—Mrs. Glen R. Matchan,
Minneapolis
Editor—Mrs. Horatio B. Sweetser, Jr., Minneapolis

WASHINGTON COUNTY AUXILIARY

The Woman's Auxiliary to Washington County Medical Society was hostess at a bridge party, Tuesday, September 29, for the benefit of the Lakeview Memorial Hospital. Mrs. S. S. Hesselgrave, past state president; Mrs. James Blake, state president; Mrs. Edward Schons, of St. Paul, president-elect; and Mrs. W. H. Hengstler, president of the Ramsey County Auxiliary, were guests.

EASTERN MINNESOTA AUXILIARY

The doctors' wives from the Central Minnesota and Chisago-Pine County Medical Societies were invited to accompany their husbands to a dinner meeting at Cambridge, Thursday, September 17. With the assistance of Mrs. Hesselgrave, past state president, the women

organized an auxiliary to the new Eastern Minnesota Medical Society. The following officers were elected: President, Mrs. H. C. Cooney, Princeton; vice president, Mrs. Charles Swenson, Braham; secretary-treasurer, Mrs. H. J. Kooiker, Milaca.

BLUE EARTH COUNTY AUXILIARY

Dr. E. A. Meyerding addressed the women of the Blue Earth County Medical Society Auxiliary at Mankato, October 5. He gave an interesting talk on the duties of auxiliary members. The auxiliary meeting was held concurrently with the doctors' meeting, and the two groups joined for a buffet luncheon.

WRIGHT COUNTY AUXILIARY

The annual meeting of the Wright County Medical Auxiliary was held October 6 at the home of Dr. and Mrs. Catlin at Buffalo. The meeting was called at four o'clock, and the work of the auxiliary discussed. Mrs. F. E. Ellison of Monticello was elected president, and Mrs. J. J. Catlin secretary and treasurer. A buffet supper was served.

RICE COUNTY AUXILIARY

The first annual meeting of the Rice County Auxiliary was held at Faribault, Wednesday, October 14, and took the form of a benefit bridge luncheon at the Hotel Faribault.

WEST CENTRAL AUXILIARY

On October 14 the West Central Medical Auxiliary held a dinner meeting at Morris. Dr. Emil Geist addressed the members.

STEELE COUNTY AUXILIARY

The Woman's Auxiliary of Steele County met at Owatonna, October 16, at the home of Mrs. E. W. Senn. Mrs. James Blake, state president, presented her program for the coming year.

BLUE EARTH VALLEY AUXILIARY

On October 8 the wives of the members of the Blue Earth Valley Medical Society met at dinner at the Hotel Constance for the purpose of forming an auxiliary. Mrs. Blake and Mrs. Hesselgrave were present and the following officers were elected: President, Mrs. R. C. Farrish, Sherburn; vice president, Mrs. A. J. Henderson, Kiester; secretary-treasurer, Mrs. H. B. Bailey, Fairmont.

RED RIVER VALLEY AUXILIARY

A dinner meeting of the Red River Valley Medical Auxiliary was held at Thief River Falls, October 6. Dr. Meyerding and Mrs. Hesselgrave were the speakers.

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

SECTION SUPERVISORS

EYE, EAR, NOSE AND THROAT

Virgil J. Schwartz, M.D.
617 Medical Arts Bldg.
Minneapolis, Minnesota

Merritt Wheeler, M.D.
1027 Lowry Med. Arts Bldg.
Saint Paul, Minnesota

GYNECOLOGY AND OBSTETRICS

Archibald L. McDonald, M.D.
Lyceum Building
Duluth, Minnesota

L. W. Barry, M.D.
810 Lowry Medical Arts Bldg.
Saint Paul, Minnesota

MEDICINE

Richard Bardon, M.D.
205 West Second Street
Duluth, Minnesota

Thomas A. Peppard, M.D.
Medical Arts Bldg.
Minneapolis, Minnesota

PEDIATRICS

Chester A. Stewart, M.D.
951 Medical Arts Bldg.
Minneapolis, Minnesota

Roy N. Andrews, M.D.
Mankato Clinic
Mankato, Minnesota

ROENTGENOLOGY

Leo G. Rigler, M.D.
University Hospital
Minneapolis, Minnesota

J. D. Camp, M.D.
Mayo Clinic
Rochester, Minnesota

SURGERY

A. E. Sohmer, M.D.
Mankato Clinic
Mankato, Minnesota

O. J. Campbell, M.D.
Medical Arts Bldg.
Minneapolis, Minnesota

EYE, EAR, NOSE AND THROAT

THE OCCURRENCE OF EYE LESIONS IN TUBERCULOUS PATIENTS: W. V. Moore (Am. Jour. Oph., 1931, Vol. 14, July, p. 596). Tuberculous eye lesions are rarely found among patients under treatment for active pulmonary tuberculosis. When patients with definite tuberculous eye lesions are thoroughly examined quiescent or healed lesions are frequently found in the lungs, tracheo-bronchial and hilus lymph glands. These primary foci may not produce constitutional symptoms, but are capable of discharging a few attenuated organisms into the circulation. It is probable that both the organisms and their toxic products may have some influence in producing lesions.

Finoff reported ocular tuberculous lesions of a severe and progressive type in rabbits following tubercle bacilli injected into the carotid; dead bacilli injected pro-

duced similar lesions but of a chronic course, resulting in scar formation.

Stark believed the foci too trifling in nature to produce enough toxin to stimulate antibody development, the bacilli having become attenuated and less virulent than those producing the initial lesion, producing little resistance to its invasion of other parts.

Kruckmann reported years in sanatoria and clinics where active pulmonary cases were treated without observing a single ocular case; in eye clinics where ocular tuberculosis was relatively frequent, careful examination usually showed a tuberculous focus elsewhere, such usually being entirely quiescent, healed or calcified hilus glands.

Reviewing the literature on the subject the author finds reported out of approximately 20,000 cases of active pulmonary tuberculosis only about twenty-four cases of ocular tuberculosis, while careful examination of about 383 patients seen because of ocular tuberculosis, 208 revealed very slight changes on X-ray examination and fifty cases showed associated clinical findings, the majority of a very minor nature.

The author reports two cases occurring in young women with active pulmonary tuberculosis, in each case an iridochoroiditis which cleared up leaving a localized chorioretinal scar, very slight vitreous haze, and a complete restoration of vision. These two cases were the only ones seen in six years in an institution of 100 to 120 tuberculous inmates.

He concludes that tuberculous eye lesions are exceedingly uncommon in patients with phthisis and that while ocular tuberculosis is probably hematogenous and secondary to a focus elsewhere in the body, most often the tracheobronchial or hilus glands, the primary lesion is almost always slight, quiescent, healed or calcified.

M. F. FELLOWS, M.D.

INJURIES OF THE EAR FROM FRACTURE OF THE SKULL: E. D. Davis, London (*Jour. of Laryng. and Otol.*, Vol. XLVI, No. 8, August, 1931). The author emphasizes the importance of immediate aural examination in cases of skull fracture, many of which involve the ear mechanism.

Cases involving the labyrinth are almost invariably fatal. Those involving the middle ear or external canal frequently recover. Hemorrhage from the canal is an unfavorable sign. If from both sides, the mortality is 66 per cent. Bleeding on one side alone shows a 39 per cent mortality. Some cases show hemorrhage into the middle ear without rupture of the drum membrane, which then appears bluish. Prolonged or copious bleeding from the canal means injury to the lateral sinus or middle meningeal artery and demands prompt surgical intervention.

Ear canals must not be plugged. Irrigation and "drops" are absolutely forbidden. If suppuration of the ear pre-existed, or develops later, the prognosis is much more unfavorable. Free drainage must then be provided at all costs (paracentesis), mastoidectomy if indicated. Recovered cases rarely suffer much hearing loss; when this does occur, it is of the middle ear (ob-

structive type). Immediate loss of hearing is common, but usually returns in three or four weeks. Seventh nerve paralysis is common but almost always recovers in weeks or months. Facial tics may be permanent. Tinnitus and dizziness may also be more or less troublesome over long periods.

Treatment means long periods of absolute rest in bed. No packing, no irrigation. Immediate establishment of free drainage should suppuration intervene, as only by this means can meningitis be forestalled.

M. W. WHEELER, M.D.

ENDOGENOUS PANOPHTHALMITIS ACCOMPANYING TONSILLITIS: F. Flandreau Van Fleet, M.D., New York (*Arch. of Ophthal.*, Vol. 6, September, 1931, No. 3). A short review of the literature indicates that the most common causative factor is puerperal sepsis although cases have been reported accompanying cholecystitis, prostatitis, pneumonia, measles, mumps, articular tuberculosis and influenza. No case has been reported due to metastasis from the tonsils. Bacteriologically the most common etiologic factors are the staphylococcus, streptococcus, pneumococcus and meningococcus.

The author then reports a case of a child, aged two, who had been suffering from tonsillitis for three days. On the second day she had pain in her right eye. The lids were edematous and tense; the cornea was hazy; the pupil was contracted and the conjunctiva was inflamed, although there was not much discharge. The general and local condition became much worse under routine treatment. Examination of the nose failed to show any involvement of the sinuses. X-ray of the sinuses showed moderate ethmoid involvement, especially on the left. Evisceration was done two days later, after which the patient made an uneventful recovery.

Culture from the conjunctival sac showed a profuse growth of *Staphylococcus albus* and short-chain non-hemolytic *Streptococcus mitis*. Culture from the tonsils showed a profuse growth of *Staphylococcus albus* and short-chain hemolytic *Streptococcus pyogenes*. At the time of operation, culture from the interior of the globe showed the same bacteriology as the tonsils.

LUCIAN G. CULVER, M.D.

THE EFFECT OF TONSILLECTOMY IN ALLERGIC CONDITIONS: S. S. Bullen, Rochester, N. Y. (*Jour. Allergy*, July, 1931, Vol. 2, No. 5, p. 310). A study was made of the records of 600 patients with symptoms of allergic conditions in the upper or lower respiratory tracts. These cases had been followed for at least one year and many for ten years by personal observation or letter.

Patients with obvious gross infections such as chronic sinusitis, chronic bronchitis, bronchiectasis, etc., are excluded. On 300 patients tonsillectomies had been done—the remaining 300 served as controls. Seventy-nine and six-tenths had positive skin reactions by the scratch test. The treatment consisted in the removal of offending substances from contact with the patient

whenever possible, as in the case of foods to which they were hypersensitive, animal emanations as in feather pillows, and so forth. Patients reacting to pollens were treated with pollen extracts.

The results of treatment are tabulated as follows:

OPERATED GROUP—PER CENT			
Good	Fair	Poor	Failure
32.6	33.4	12.4	15.6
66			(6 refused treatment)
UNOPERATED GROUP—PER CENT			
Good	Fair	Poor	Failure
31.7	37.7	12.0	16.6
69.4			(2 refused treatment)

The incidence of allergic manifestations in a ten year follow-up group of 2,000 children (Dr. Albert D. Kaiser's records) was as follows:

1,000 children (tonsillectomy)	1,000 children (controls)
41	Allergic coryza or asthma

LAWRENCE R. BOIES, M.D.

THE SYMPTOM OF VERTIGO: W. E. Grove, Milwaukee (Arch. of Otolaryngology, August, 1931, Vol. 14, No. 2, p. 177). Turning vertigo is nearly always a sign of disturbed vestibular function; tactile vertigo may also at times be of vestibular origin. From an examination of approximately 300 patients suffering from injuries to the head, the author states positively that true turning vertigo accompanied by spontaneous nystagmus is present in a fairly considerable number of cases in which the most thorough and exacting examination of the peripheral vascular system revealed it to be functioning in a normal manner. It is the author's contention that in these persons the vertigo is caused by damage to the central vestibular area situated beneath the floor of the fourth ventricle.

If the patient exhibits true turning vertigo he must have or must at some time have had spontaneous vestibular nystagmus. This may not be present on every examination. It may be elicited by the head movement tests of Brunner.

The vertigo of a labyrinthitis or due to exclusion of a labyrinth by transverse fracture of a pyramid is violent and continuous. It improves after a few days and disappears entirely after a lapse of 5 or 6 weeks, because after this length of time the other labyrinth has learned to compensate for the loss of its mate.

The vertigo of a vasomotor disturbance in the central vestibular area is not continuous, nor is it so severe as to be completely disabling. It comes on in short spells of a few minutes duration brought on by such factors as rolling and turning in bed, looking up suddenly, bending the head forward suddenly, going above ground level, undue exposure to sunlight, mental and physical exertion, and even the slightest use of alcohol in any form.

The duration of the vertigo may assist one to some extent in making a diagnosis. In general, it may be said that if the vertigo lasts only a short time and then vanishes completely, it is more probably being caused

by some acute condition of the labyrinth or vestibular nerve than a lesion in the brain stem. On the other hand, if the vertigo lasts longer and comes on in attacks over a period of years, it is more apt to be due to some lesion of the central nervous system although a chronic disease of the labyrinth cannot be excluded.

LAWRENCE R. BOIES, M.D.

THE PATHOGENESIS OF OTOSCLEROSIS:

K. Wittmaack, Hamburg, Germany (Arch. of Otolaryngology, August, 1931, Vol. 14, No. 2, p. 186). Wittmaack outlines the basis for his contention that venous stasis is an etiological agent in the production of otosclerosis. His investigations are in part supported by the Research Fund of the American Otolaryngological Society.

The author points out the generally accepted fact that the bony labyrinth normally differs from all other bones of the skeleton. It is formed on a cartilaginous capsule by endochondral ossification which starts from so-called points of ossification, in contradistinction to other endochondral bones. The labyrinthine capsule attains its final structure and size early in life and normally does not undergo further transformation. Consequently, the distribution of blood vessels, which is determined by points of ossification, also remains practically unchanged. These structural peculiarities are also found in some other mammals than man, and in certain non-mammals. In animals, however, spontaneous disease of the labyrinthine capsule similar to otosclerosis has not yet been observed. The author has, however, been able to reproduce repeatedly lesions in the hen which are essentially identical with the pathological processes seen microscopically in human otosclerosis.

The experimental production of venous stasis is accomplished by introducing ferric chloride into the intracranial median sinus. In 80 per cent of the cases positive results were obtained. Photomicrographs are reproduced comparing the experimental picture in the hen with the picture of human otosclerosis. The similarity is striking.

LAWRENCE R. BOIES, M.D.

MEDICINE

TUBERCULOSIS ABSTRACTS*

As the mariner trims his sails to the weather, so the physician adjusts his therapeutic measures according to the pathological course of the disease. While general principles must guide us in the treatment of tuberculosis, no formula applicable to every case can be devised. If one understands the sequence of events following infection by bacillus tuberculosis, the response of the tissues and the natural processes of healing, treatment becomes more rational and adaptable to the immediate need. The most we can do in our present state of knowledge is to support the natural ten-

*Reprinted from Tuberculosis Abstracts, a review for physicians issued monthly by the National Tuberculosis Association, November, 1931, Vol. IV, Number 11.

dencies of the body to overcome the disease. M. Jaquero of Leysin, Switzerland, discusses the natural processes of healing in pulmonary tuberculosis in *Tubercle*, of July, 1931. Abstracts of the article follow.

HEALING PROCESSES IN TUBERCULOSIS

Radiography enables us to demonstrate the anatomical changes taking place in tuberculosis during life and ending in cure with a precision which is almost equivalent to post-mortem findings. Pulmonary tuberculosis was formerly considered as a chronic ailment from the very beginning. We now know that the disease passes through various stages before it arrives at a condition of chronicity. Virchow taught that all pulmonary tuberculosis lesions necessarily originated from miliary tubercles, solitary or conglomerate, and that these were the only specific lesions produced by the tubercle bacillus. Congestive or simple inflammatory changes in the region of chronic foci had been observed, but these changes were regarded merely as neighboring reactions without clinical significance. Today, we know that these lesions *are* tuberculosis, that they preceded the chronic lesions, and that during a period of a year or more they may exist alone and constitute the whole of the disease.

INFLAMMATORY NATURE OF TUBERCULOSIS

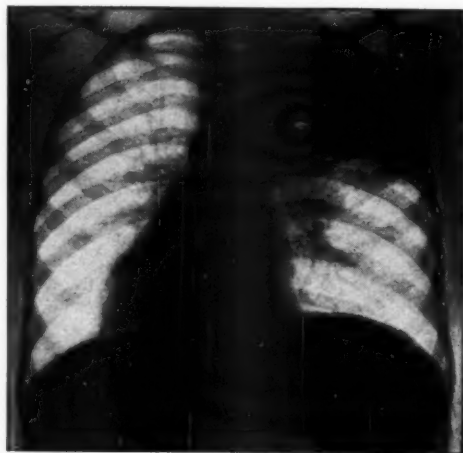
Wilson-Fox and Green, two English pathologists, recognized the pneumonic nature of the lesions (in 1873-74) before the tubercle bacillus had been discovered. Thacon, in France (1885), found that the tubercle bacillus was really the sole cause of tuberculous pneumonic lesions. Only ten years ago, the distinction between miliary (productive) and inflammatory (exudative) lesions was recognized in Germany.

This conception of the pneumonic or inflammatory nature of tuberculous lesions at their origin is of practical importance. As long as the lesions are in the inflammatory stage, they may heal by resolution comparable in every way to the resolution of the lesions in acute pneumonia, except that the process of regression lasts several months instead of one or two weeks. In the pneumonic stage, the bacilli are not yet solidly implanted in the tissues as in miliary type lesions but are still on the surface of the mucous membrane between the epithelial cells in the alveoli and the intercellular spaces. Consequently, their destruction and elimination by phagocytes or other means is rendered much easier. Only when these lesions do not heal do the manifold lesions of chronic tuberculosis develop, and these heal with greater difficulty. Indeed, when that has occurred, healing is possible only by the complicated processes of fibrosis and pulmonary retraction.

TIME ELEMENT IMPORTANT

The question, "How recent is the disease?" (that is to say, the lesion) has acquired a high clinical importance from the standpoint of prognosis and treatment. In recent pulmonary lesions, two types must be distinguished. The first type is encountered chiefly in childhood in an individual not previously infected and, therefore, non-allergic. If in this case the infection is

slight, tuberculin sensitiveness will be produced but no actual disease capable of giving rise to clinical symptoms of obvious anatomical lesions. This the author calls abortive tuberculosis. But if the infection is more serious, actual disease may occur. The lesion is of relatively slight importance and it consists usually of an infiltration in the neighborhood of the point of inoculation with swelling of the lymph nodes at the hilum. These lesions are recognized by radiography. (In the United States, this type is designated as the childhood type of tuberculosis.) They regress slowly



X-ray plate, chest of boy, aged 8. Consolidation of right upper lobe with marked enlargement of lymph nodes from fourth to eighth posterior ribs. Physical signs: left, normal; right, limited expansion, dullness, bronchial breathing, and rales. Tuberculin test positive. Temperature up to 100.4° during dispensary observation. Twelve per cent underweight. Cough marked, sputum positive in April to animal inoculation; in May, to routine examination.

Twenty months later, the upper lobe had contracted somewhat and was less opaque; fresh infiltration had appeared in the middle lobe; the lymph nodes had diminished slightly and were beginning to calcify. In ten months more, both the upper and middle lobes cleared considerably and the outlook is now hopeful. (From "Childhood Type of Tuberculosis," Chadwick and McPhedran, Nat. Tuberc. Assn.)

and heal by resolution, leaving no trace other than calcification in the hilum glands (tracheobronchial nodes). When the infection is too massive or if the resistance is not sufficiently good, the disease may continue to develop past the non-allergic phase and the lesions may soften or generalize.

When bacillary infection takes place in an individual already sensitized by tubercle bacilli (reinfection), the pulmonary reactions may be much more intense, while the reaction of the pulmonary lymph nodes is almost nil. (In the United States, this form is called adult type of tuberculosis.) The inflammatory reaction may go so far as necrosis of parts of the lung, ending in cavity formation. But this cavity is quite different from that of chronic tuberculosis. Its walls are not formed by a well organized pyogenic membrane but by simple inflammatory tissue; and for that reason may heal by resolution without leaving any apparent fibrous

scar. The cavity is, therefore, not always the final and most serious lesion of pulmonary tuberculosis.

The early forms of tuberculosis described are capable of cure by resolution; the chronic form only by the complicated processes of fibrous transformation and natural or artificial organic modification.

PNEUMOTHORAX FAVORED

The author is of the opinion that pneumothorax treatment is indicated in almost all cases of pulmonary tuberculosis as soon as diagnosed. Others consider that they are justified in waiting a certain time while placing the patient in the best possible condition for the cicatrization of his lesions. In favor of intervention, the author mentions the physician's preference for a method which enables him to play an active part and at the same time to verify speedily the results of his intervention.

He also feels that, as the first two or early forms always exist before the third, it is in these early stages that the bacillus can be most easily attacked, and, therefore, the possibilities of finding a remedy, of checking and curing pulmonary tuberculosis, are most promising if directed to the early types. He thinks, therefore, that the search for a cure should be directed to some remedy capable of facilitating the process of resolution. —*The Natural Processes of Healing in Pulmonary Tuberculosis*, M. Jaquerod, *Tubercle*, July, 1931.

THERAPEUTIC RESEARCH

The ideal of therapy is, of course, a practicable bactericide. Meanwhile, as we await this, it would appear that a study of structure would suggest the following paths as worthy of exploration:

1. That directed toward the discovery of a medium or method to accelerate and heighten cellular proliferation and fibrosis. Dangers lie in enhancing the tendency of tissues to tumor-formation.
2. That toward a medium to neutralize the intoxicating products of the allergic reaction. If it were non-specific, it might prove a veritable boon in many infectious diseases.
3. That toward a medium to neutralize the poisonous products that proceed from tuberculous foci. For reasons frequently expressed, it is believed that these are not specific, but are substances that result from the death and disintegration of the cellular components of foci. Can a substance antagonistic to them be found? Or a substance that would so act upon the body as to ward off their physiological effects?—*The Evolution of Tubercle*, Allen K. Krause.

LEUKOCYTIC REACTION IN TUBERCULOSIS OF INFANTS AND CHILDREN: Carl H. Smith (Amer. Jour. of Med. Sci., August, 1931). The important white blood count is best demonstrated by the newer technic. It reflects the pathological status of the tuberculous lesion.

Sabin comments as follows: The major effect of tuberculosis is on the monocyte. The bacillus grows within the monocyte. The lymphocyte is concerned with limitation of the spread. This reaction may be measured by the preponderance of the lymphocyte.

The activity is indicated by increased monocytic count. Reversal of the normal relationship indicates activity or extension. When arrest takes place, lymphocytes are increased. Medlar emphasizes the fact that the polymorph-neutrophile indicates tuberculous abscess formation. The supra-vital technic of Sabin allows of examination of cells in the living state, thus allowing more accurate cell differentiation.

STUDY

The monocyte (identical with the transitional cell of Ehrlich, including also what is known as the large monocyte) has an eccentric nucleus and is distinguished by a rosette about the centrosphere. The monocyte loses its motility when it becomes the host of the bacillus, and is stimulated or modified. Result: development of the epithelioid and later the giant cell of Langhans. These changes may be seen in supra-vital films.

The study included 291 supra-vital counts. Ninety-three cases were infants and children. Fifty were of the normal group. (See tabulated results.) The results would indicate, (1) that increase of the neutrophils and monocytes is related in an important way to extension and activity; (2) that lymphocyte increase is associated with resistance; (3) that normal children have a high lymphocyte count—lymphocyte comparisons must be made with the normal; (4) that the monocyte-lymphocyte ratio increases with age from .09 to 1. In acute tuberculosis there were seventeen cases; fourteen of these were meningitis from five to six years.

RESULTS

- (1) The total white blood count was elevated.
- (2) Neutrophilic leukocytes and monocytes were increased.
- (3) Lymphocytes were decreased.
- (4) Stimulated or modified monocytes were frequent.

Epithelioid cells were less frequent. In the sub-acute and chronic form there were ten cases. Three patients had pleurisy, two epituberculosis. Five had extra-pulmonary forms. These, especially the extra pulmonary forms, had low monocyte-leukocyte ratios.

In latent forms of tuberculosis with a positive reaction to low tuberculin dilutions, eosinophiles were above normal in one-half the cases.

Rich remarks that allergy and resistance cannot be used interchangeably.

Sabin notes that the monocytes and their derivatives are hosts of the tubercle bacillus and are related to dissemination. Epithelioid cells are found in Hodgkin's disease. Regression and progression are reflected in the peripheral blood picture.

CONCLUSIONS

- (1) The blood picture of a tuberculous infant may be co-related with the activity of the pathologic lesion.
- (2) The complete index of activity is as follows:
 - (a) Increase in white cell count.
 - (b) Elevation in p.m.n. and monocytes.
 - (c) Drop in eosinophiles and lymphocytes.
 - (d) Rising monocyte-leukocyte ratio.
 - (e) Reversion to former type in healing.

(3) The trend is ascertained by numerical comparison, emphasis on the monocyte-leukocyte ratio.

(4) This examination often furnishes the earlier signs of change in the status of the disease in childhood.

J. G. LAMONT, M.D.

URINARY ACIDITY IN TUBERCULOSIS: K. L. McCluskey, Chicago Municipal San. (Amer. Rev. of Tuberc., August, 1931, XXIV, p. 182). *Pathological conditions* resulting in acidosis are: Diabetes mellitus, uremia, nephritis, rheumatism and heart diseases.

Normal metabolism produces acids which are removed by the lungs (carbonic acid), kidneys (mineral and organic acids), and skin. Excessive tissue destruction and metabolism of the tubercle bacillus itself throw greater demand upon the governors or regulators of body-neutrality. Disturbances may be expected to appear first in the urinary secretion.

Acidosis results from *over-production* or *retention* of acids. Acid waste is neutralized by blood alkalies. The kidney returns part of the alkali to the blood and excretes the rest as salts. If the acid products are not neutralized by blood alkalies, the urinary picture is that of decreased pH, increased titratable acidity and decreased normal dibasic phosphate and ammonia. The kidney is thus called upon to excrete a urine of higher acid intensity. The result is frequent, slight albuminuria. In acidosis, with neutralization by blood alkalies, there is lack of alkali conservation. The urine shows increased pH and a lower titratable acidity with an increase of dibasic phosphate.

The study included eighteen subjects:

Group I—6 patients working 3 to 5 hours daily.

Group II—3 patients, confined to bed.

Group III—6 patients, critically ill.

Group IV—3 normal subjects.

All of the urines were free from sugar and albumin, except two minor albuminurics who were critically ill.

Urine was collected for a day-period and a night-period, 8 to 8, and these were analyzed separately, for: (1) ammonia, (2) titratable-acidity, (3) pH, (4) creatin, (5) creatinin, (6) organic acids.

CONCLUSIONS

1. The pH value of the first two groups was identical with the normal group for the day-period.

2. The pH value of the night-period for group I is below that of normal group, and group II is still lower.

3. The creatinin co-efficient is lowered with the severity of the disease. There is greater creatinin secretion at night.

4. Creatinin values are variable.

5. Critically ill patients had an increase in ammonia; conclusion, overwithdrawal of fixed alkalies.

6. The amount of titratable acidity is greater at night than at day.

7. Total inorganic acids fall consistently from group I through group III.

8. Total organic acids are lower than normal except the critically ill, who show an increase over group II.

9. The quantity of inorganic acid slightly exceeds the organic acid.

10. Tuberculosis causes a mild but not a pronounced degree of acidosis. Blood alkali is conserved first and later depleted in the advanced stages.

11. A pre-eminently base-forming diet would assist the body in overcoming the acidosis.

JOHN G. LAMONT, M.D.

PEDIATRICS

STUDIES IN SCARLET FEVER VI—COMBINED ACTIVE AND PASSIVE IMMUNIZATION TO SCARLET FEVER: A. Lichtenstein (Acta Paediatr. X:4:539, June, 1931). From the Epidemic Hospital at Stockholm, Lichtenstein reports the results of attempts to secure immunity to Scarlet Fever by a combined method of serum and vaccine treatment. The 82 persons chosen for the experiment had all been directly exposed to the disease and showed positive Dick reactions. The adults were given either 20 c.c. of scarlatinal streptococcal serum or 50 c.c. of convalescent's serum—children, one-half the dose. Immediately, and within a week's time, each was also vaccinated with toxin plus bacteria. The vaccine was injected at intervals of three to seven days for five doses, adults receiving respectively 100 million, 500 million, 1 billion, 2 billion and 5 billion streptococci and 30, 150, 300, 600 and 1,500 skin test doses. Children under five years were given 100, 300, 500 and 700 million and 1 billion streptococci respectively, combined with 30, 90, 150, 210 and 300 skin test doses. The patients experienced no discomfort subsequently. In twenty-seven of forty adults and in thirty-seven of forty-two children, the Dick test turned to negative following the serum injection. All were found Dick-negative after vaccination. In none of the three groups thus treated was there any further scarlet fever for the next few months. One of the children contracted the disease five months later, and, upon testing, six out of twenty children were found to have positive Dick reactions at the end of six months, though weaker than previously.

The author is conservative in drawing his conclusions, but believes that the results are encouraging enough for further investigation, and suggests that increased doses of vaccine might prolong the period of immunity.

L. G. FRARY, M.D.

STUDIES IN SCARLET FEVER. VII: TREATMENT WITH STREPTOCOCCUS ANTITOXIC SERUM: A. Lichtenstein (Acta Paediatr. X:5:549-575, June, 1931). Scarlatinal streptococcus antitoxic serum was first used at the Epidemic Hospital of Stockholm in 1925, and the author was so impressed with its value that it has been used in all serious cases since that time, unless there was some contra-indication. He now reports data from the years 1926-1929 inclusive, during which time, 2,104 cases of scarlet fever were admitted, of which 512 were given antitoxic serum.

He regrets the lack of a control group but did not feel justified in choosing only alternate cases because of the efficacy of the treatment. Children were given an intravenous dose of 10 c.c. immediately; adults, 10 or 20 c.c., depending on the severity of symptoms. The dose was repeated on the next day if there was no definite result, unless complication developed. In a small group, serum was injected intramuscularly.

It was early discovered that results were entirely different in complicated and uncomplicated cases. Where there was no complication, there was regularly noted a critical fall of temperature immediately after the injection, to about 37° C., with a corresponding rapid improvement of all symptoms. In 280 out of 350 patients, the result was of this type, i.e., "complete"; in fifty-seven, there was a critical fall to about 38° C. and a decided improvement, i.e., "good"; in thirteen, results were negative. In a series treated with convalescent serum, results were less favorable, 219 being "complete," ninety-two "good" and thirty-nine negative. For reasons given later, serum should be given early, although it was found to be effective as long as toxic symptoms were present, even into the second week.

Serum treatment was ineffective against already existing complications—in fact the author believes that failure to secure an immediate complete serum effect is evidence of presence of a complication, and should indicate a thorough search for such a complication. Improvement in the general toxic condition of the patient even in the face of complication, however, seems to occur, so that he favors giving serum. Early serum treatment may reduce the frequency of complications, but, after the third day, such is probably not the case. There were no deaths in cases treated before the onset of complications, nor among those which were so mild from the start that serum was not considered necessary. In three of the eight deaths occurring in the series given sera, scarlet fever was only a contributory cause of death; in the other five, the powerlessness of sera against existing complications was clearly demonstrated.

There was little serum sickness, and few bad effects resulted from treatment, all of which were easily controlled. The author suggests that the unfavorable effects reported in America may be due to the use of a more concentrated serum than that made in Sweden. Throughout this study, Swedish serum was used. As to effect on mortality, the author prefers to draw no definite conclusions, since there has been a general decrease in the severity of the disease in Sweden, and since he had no control group. He believes the real test will come when a severe epidemic occurs.

L. G. FRARY, M.D.

VIOSTEROL AND COD LIVER OIL! E. O. Prather, Jr., M.S., Instructor in Pharmacology, University of Tennessee; Martha Nelson, M.S., Asst. in Research, Edward Clay Michell Clinic; and A. Richard Bliss, Jr., M.D., Chief, Division of Pharmacology, Memphis, Tenn. (*Amer. Jour. of Diseases of Children*, July, 1931, Volume 42, Number 1).

Because of the vagueness and the indirectness of

some manufacturers' statements concerning viosterol, there is a growing belief among pediatricians and physicians in general that viosterol is a concentrated substitute for cod liver oil, and the substance is enjoying an increasing popularity as a "substitute for cod liver oil."

Although aware of the fact that cod liver oil contains two vitamins and viosterol only one, the average physician is better acquainted with the antirachitic vitamin, and is likely to disregard the importance of fat-soluble vitamin A and its influence on the child's resistance to infections.

When animals are fed a purified diet adequate in proteins, inorganic salts, calories and vitamin B, they grow well for a short time; then the weight becomes stationary or decreases rapidly, and xerophthalmia develops. The upper respiratory tract becomes inflamed; the liver and spleen become discolored, shrunken and infiltrated with fat; the kidneys become sand-colored, and the intestines are found to be thin-walled and filled with gas. In some cases, the stomach, as well as the entire intestinal tract, is badly distended. No visible intraperitoneal fat is present. The intestines vary in color from dull brown to a degree of inflammation that is almost red. The amount of calcium deposited in the bones is very small.

The addition of viosterol to a diet like the aforementioned one increases the calcification of the bones, but it does not prevent or cure the xerophthalmia or increase the growth of the animal. The addition of cod liver oil to the aforementioned diet results in excellent growth of the animals, a better calcification of the bones, an increased deposition of body fat and normal respiratory tracts, and the liver, kidneys, spleen and intestines are found to be normal.

Viosterol, therefore, does not demonstrate the power to stimulate growth and development of the body and vital organs, or to prevent infections of the upper respiratory tract or to produce the same degree of calcification and growth of the bones as does cod liver oil.

Since "colds," malnutrition and intestinal inadequacies are more frequent in children than rickets, this study emphatically suggests that the apparently widespread substitution of viosterol for cod liver oil in the diet of the child is not logical and may result in an appreciable decrease of the child's strength and resistance to infections.

R. N. ANDREWS, M.D.

HIRSCHSPRUNG'S DISEASE TREATED BY LUMBAR SYMPATHECTOMY: T. Wood Clarke, M.D., and Frederick M. Miller, M.D., F.A.C.S., Utica, N. Y. (*Arch. of Ped.*, September, 1931, Vol. XLVIII, No. 9). Congenital idiopathic dilatation of the colon, megacolon, giant colon, or Hirschsprung's disease, is a congenital malformation characterized by dilatation of the colon, abdominal distention, obstipation, at times alternating with diarrhea, emaciation, and general weakness.

The surgical treatment, until recently, has consisted of colostomy with artificial anus, or of colectomy. The

most recent surgical suggestion is lumbar sympathectomy.

In 1924, N. D. Royle, the orthopedic surgeon, and John I. Hunter, Professor of Anatomy of Sydney, Australia, working together, proved experimentally that resection of the sympathetic ganglia relieved the spasticity of the extremities in animals in which artificial spastic paralysis had been produced. Hunter further showed that in paralyzed animals in which the distal portion of the colon was quiescent and dilated, excision of the lumbar ganglia caused immediate resumption of activity of the distal colon and expulsion of feces.

In 1929 and 1930, Learmouth and Markowitz of the Mayo Clinic, by animal experimentation, confirmed the researches of Langley and Anderson, and of Hunter. Among their conclusions are that section of the lumbar colonic nerve invariably leads to an immediate increase in intracolonic pressure and in the amplitude of the contraction of the colon, and that the internal sphincter derives a certain amount of motor innervation through the lumbar sympathetic outflow.

Merle, Scott and Morton add a contribution by demonstrating in two cases of Hirschsprung's disease that spinal anesthesia temporarily terminated the motor inertia of the large bowel and caused copious bowel movements.

The results of the operation of lumbar sympathectomy, in the small number of cases in which it has been performed, have been uniformly favorable. The patients have shown remarkable improvement in their general health. The abdominal distention has decreased with variable rapidity, and the patients, who previously had suffered from obstipation, report regular bowel movements once or twice a day, usually without the aid of laxatives or enemata. There have been no deaths reported from the operation. No untoward symptoms in reference to other pelvic organs have occurred.

R. N. ANDREWS, M.D.

FEBRIPHOBIA: Charles Herrman, M.D., New York (Archives of Ped., September, 1931, Vol. XLVIII, No. 9). There are three manifestations in children which cause great anxiety to the parents and often take the physician out of his comfortable bed at night—convulsions, severe hemorrhages and high temperatures. The significance of high temperature depends on its cause. In some cases it may represent a favorable reaction. The febrile reaction seems to represent an attempt on the part of the organism to counteract the injurious effect of the entrance of foreign material, an increased effort to fight the disease by stimulating the circulatory, respiratory and endocrine systems. As is well known, the good effect of baths, douches and packs is not due solely to the reduction of temperature, for this is often slight, but also to the favorable effect on the nervous system.

The fact that a given procedure results in a reduction of the temperature is not in itself proof that the patient is benefited and the disease controlled. Antipyretic drugs, aside from their depressing effect on the

heart, may interfere with the rapid development of antibodies.

Apparently a high temperature, like a high polymorphonuclear leukocyte count, indicates a severe infection, but such patients may also have a good resistance. It is important to know whether, in addition to the high temperature, the patient presents other serious manifestations, such as a poor circulation and disturbances of the nervous system. If the child has an appetite and requests food there is no reason why at least carbohydrates and fruit juices should not be given. Fluids in sufficient quantity are absolutely essential and should be insisted on to prevent dehydration, to increase elimination and the removal of ketone bodies.

The anxiety produced by a marked rise in temperature in children, when unaccompanied by other serious manifestations, is out of all proportion to the danger.

R. N. ANDREWS, M.D.

ABDOMINAL PAIN IN CHILDREN WITH UPPER RESPIRATORY INFECTIONS: Ralph R. Scobey, M.D., Syracuse, N. Y. (Arch. of Ped., September, 1931, Vol. XLVIII, No. 9). Abdominal pain in children, resulting from infections of the upper respiratory tract, occurs more frequently than is generally supposed.

Brennemann, in 1921, and again in 1927, called attention to the incidence of this condition in connection with throat infections. The pain was usually in the region of the umbilicus. Brennemann felt that the cause of the abdominal pain was due to mesenteric or retroperitoneal lymphadenitis. His conclusions were prompted by the fact that it was usually present during the acute infection and often outlasted it. Enlarged abdominal lymph nodes were often observed in cases of this kind, which were operated. He also called attention to similar adenopathy found at autopsy in cases of influenza.

The fact must always be borne in mind that a pathological appendix can co-exist, or be secondary to an upper respiratory infection. Attention has been called by many writers to the fact that cases of appendicitis may occur in greatly increased numbers during epidemics of grippal infections.

Another condition, which has received little attention in the literature as a cause of abdominal pain, is "irritable colon." MacDonald calls attention to this condition associated with acute upper respiratory infections. There is still another condition which is responsible for abdominal pain and which may manifest itself during an acute upper respiratory infection, namely, pyelitis.

While it has been shown that abdominal pain may result from infections of the upper respiratory tract, one must not lose sight of the fact that serious abdominal pathology may exist and be entirely independent. It must be remembered, also, that appendicitis is one of the commonest causes of abdominal pain and may present itself much more frequently during epidemics of upper respiratory infections.

R. N. ANDREWS, M.D.

ROENTGENOLOGY

OBSTRUCTIVE LESIONS OF THE SMALL BOWEL: C. H. Heacock (*Radiology*, July, 1931, XVII, 119-124). Cases of intestinal obstruction fall into one of the following groups: (1) Those in which a clear-cut, definite clinical diagnosis can be made and in which the findings localize the site of the obstruction, (2) those in which the clinical diagnosis is definite but in which there are no localizing symptoms or findings, (3) those in which the diagnosis is uncertain, and (4) those in which the diagnosis is not even suspected by the clinician.

Whenever there is any doubt about the presence or location of an obstruction, *i.e.*, in the last three groups, there is an indication for a roentgenologic examination. The extent of the examination and the amount of work required will depend largely upon how acute and how complete is the obstruction.

If the roentgen examination is to be of much benefit in the acute cases, it is of utmost importance that the examination be completed quickly and with minimal tax upon the strength of the patient. These acute obstructions usually develop soon after an operation. It is important to make this examination in both the supine and erect positions, and with the motor-driven table both fluoroscopic and radiographic studies can be made without any exertion on the part of the patient. If the patient cannot be removed from his bed, roentgenograms can be made in two planes without moving him and a great deal of information obtained.

While small amounts of gas may exist normally in the small bowel, the only collections of gas seen on the radiographs of normal individuals occur in the stomach and colon. Collections of gas in the small bowel are, therefore, always significant, and, when the additional signs of distention and fluid levels are present, definite criteria for the diagnosis of obstruction may be said to exist. The fluid may be easily overlooked unless the patient is examined in two planes, preferably the supine and the erect postures.

Usually the appearance and distribution of the gas enable the roentgenologist to determine its location. In the small bowel haustral markings are absent, while the valvulae conniventes stand out prominently.

In chronic or partial obstruction there may be no distended loops of small bowel and no information obtained on what Davis calls the "scout film." In this type of case the administration of barium is necessary to make the diagnosis. It is also in this type of case that the diagnosis is most often doubtful and the need for immediate interference not so urgent. Within this group fall the neoplasms—both benign and malignant—and it must be remembered that the early detection and localization of the latter lesions determine the success of the treatment. The examination with the ingested meal, which may require forty-eight hours, is permissible. Thus far no untoward effects have been observed.

There are two reliable roentgen signs of partial obstruction. One is dilatation of the lumen proximal to the obstruction and the other is a disturbance in motility.

The slowing up and damming back of the current is manifest throughout the small intestine, and there may even be a gastric retention. The delay becomes progressively more pronounced until the point of obstruction is reached. After passing this point the normal progress of the meal is resumed. It is important for the roentgenologist to know the normal motility for the opaque mixture he is employing. This will vary somewhat, depending upon how much fat and carbohydrate are added to the barium. Delayed motility due to obstruction must not be confused with stasis in the small bowel without mechanical obstruction. Stasis usually occurs in the ileum and may be associated with no organic lesion. Lesions in the colon, especially the right half of the colon, must be ruled out and the possibility of a regurgitation through the ileocecal valve must be considered. The finding of barium at the twenty-four-hour observation is always significant and, in the absence of a lesion in the colon, generally means an obstructive lesion in the terminal ileum. While there is delayed motility in both stasis and obstruction in the former, dilatation of the lumen does not occur.

JOHN D. CAMP, M.D.

ELABORATION OF CRITERIA UPON WHICH THE EARLY DIAGNOSIS OF ACUTE INTESTINAL OBSTRUCTION MAY BE MADE. WITH SPECIAL CONSIDERATION OF THE VALUE OF X-RAY EVIDENCE: Owen H. Wangenstein (*Radiology*, July, 1931, XVII, 44-62). The present high mortality in acute intestinal obstruction is due in large measure to late diagnosis. Revision of the usual criteria upon which the diagnosis of bowel obstruction is made is urgently indicated. Obstipation, regurgitant vomiting, and general abdominal distention portend the beginning of the end of life for the unfortunate sufferer with bowel obstruction. These must cease to be occurrences awaited before the diagnosis is made.

Intermittent, crampy, colicky pain associated with nausea and vomiting but unattended by local physical findings suggests acute intestinal obstruction. The bowel below the point of obstruction is physiologically as well as anatomically normal and will expel an administered enema, with the return of gas and feces. Gaseous shadows in the small intestine demonstrate the presence of intestinal stasis. The "ladder pattern" of gaseous distention in the small intestine need not be awaited to make the diagnosis. The stethoscope serves to distinguish whether the stasis is mechanical or paralytic in character. When the diagnosis is made early the mortality of operation for acute intestinal obstruction will exhibit a like improvement to that long ago manifest in the surgery of most other acute abdominal catastrophes.

In simple obstruction to the continuity of the small intestine gas may be visualized in the small intestine usually within four or five hours after the onset of symptoms. When the obstruction is in the colon a variable time may elapse before gaseous distention of the small intestine becomes visible on the X-ray film. In strangulation obstructions gaseous shadows in the

small intestine do not appear as early as in simple obstructions and this criterion is, therefore, not as reliable an index as in the latter type of bowel occlusion. In vascular occlusions of the mesenteric vessels, gaseous distention does not occur as early as in simple obstruction. In the inhibitive ileus of peritonitis, gaseous distention of the small intestine may be observed early. Gaseous distention of both colon and small intestine is almost invariably present. The presence of dense "bands" between the dilated intestinal loops suggests the presence of exudate between the intestinal coils.

The entity of functional spastic ileus which simulates mechanical obstruction in all clinical features may be identified by proper correlation of clinical and roentgen findings. The special uses of X-ray evidence of obstruction are enumerated for intestinal atresia, imperforate anus, and intussusception. In the latter condition the barium enema may frequently be employed to reduce the invagination.

JOHN D. CAMP, M.D.

THE ROENTGEN DIAGNOSIS OF AORTIC ANEURYSM: Harper G. Sichler (*Radiology*, August, 1931, No. 2, 304-316). Comparative clinical and autopsy statistics indicate that many cases of aortic aneurysm are not diagnosed during life. Sacculated aneurysms, while the most common, are not the only type of aortic aneurysm, and the roentgen diagnosis should not be made contingent on finding local sacculations. All cases of syphilitic aortitis with dilatation should be kept under observation until it has been determined by the progress of the lesion whether or not the aortitis is complicated by aneurysm formation. Squaring of the aortic arch is characteristic of syphilitic aortitis.

A study of seventy-seven cases of aortic aneurysm occurring during a five-year period demonstrated the percentage of occurrence to be 0.06 per cent, that the proportion of syphilitics with aortic aneurysm was 1.6 per cent, and that of the total number of aneurysms 97 per cent were of syphilitic origin. The roentgen examination discovers a large number of cases of aortic aneurysm (nearly 30 per cent of this series) which produce no clinical signs or symptoms of their presence.

JOHN D. CAMP, M.D.

THE OSSEOUS CHANGES IN HYPERPARATHYROIDISM ASSOCIATED WITH PARATHYROID TUMOR: A Roentgenologic Study: John D. Camp and Harold C. Ochsner (*Radiology*, July, 1931, XVII, 63-69).

The roentgenographic changes observed in the osseous system in two cases of hyperparathyroidism associated with tumor of the parathyroid glands are presented. The osseous changes in roentgenograms consists of generalized osteoporosis, cystic lesions, and deformities. The generalized osteoporosis is characterized by a miliary or granular appearance. This change is best observed in the skull and appears to be peculiar to hyperparathyroidism. In addition, the bone

trabeculae and cortical bone are thinned, and areas of subperiosteal absorption are seen in the long bones and phalanges. Single or multiple cystic lesions are found in the jaw, pelvic bones, and long bones. These lesions are often confounded with those of osteitis fibrosa and with giant-cell tumor. The deformities due to softening of the bones consist of kyphosis, narrowing of the pelvis, coxa vara, bowing of the legs, and infractions. It is not unlikely that pathologic fractures may even occur. In addition, renal calculi are not uncommonly found. In each instance, removal of a parathyroid tumor was followed by a definite arrest of decalcification and progress toward restoration of normal bone structure, as observed roentgenographically.

JOHN D. CAMP, M.D.

SURGERY

TREATMENT OF VARIOUS PERIPHERAL PAIN SYNDROMES BY SUBARACHNOID ALCOHOLIZATION OF POSTERIOR NERVE ROOTS, AT THEIR EMERGENCE FROM THE SPINAL CORD: A. M. Dogliotti, M.D., University of Turin, Italy, *La Presse Medicale*, Number 67, August 22, 1931.

The author reviews the various nerve tracts by which pain is carried from the periphery to the brain. In such conditions where the usual conservative treatment does not help, before resorting to the more serious surgical attacks, such as laminectomy, postero-radicalomy, and anterior lateral cordotomy (procedures which, besides being serious undertakings, are not always reliable for physical and anatomical reasons), he proposed, and has used, subarachnoid injections of absolute alcohol to block these nerves, and in this way relieve or cure painful conditions of various kinds. The substance used is absolute alcohol, which he has shown by in vitro laboratory test will rise to the surface of spinal fluid, and mix with it very slowly. Dosage and physiological effects have been studied in the dog, and later used in the human in a series of 45 cases.

The method consists in making the usual lumbar puncture at a pre-determined site in the median line between the spinous processes; for pain in the sacral plexus, the interval between the 5th lumbar and 1st sacral is used; for pain in the lumbar roots, the spaces between 3rd, 4th, and 5th lumbar are used; for the lateral femoral-cutaneous and ilio-inguinal regions, the injection is made between the 2nd and 4th lumbar vertebrae; for visceral abdominal and lower intercostal pains, the space between the 12th dorsal and 1st lumbar, or, better, between the 1st and 2nd lumbar vertebra, is used; for intercostal injection, the corresponding vertebral space is used; for pains in the upper extremities, the lower cervical spaces would be indicated were it not for the difficulty of the intervention of the cervical dorsal protrusion of the cord, so that, instead, the space between the 4th and 5th dorsal vertebrae is used, assisted by placing the patient in such elevation of the

trunk as to locate the alcohol in the desired region of the cord.

The patient is put in the classical position for the spinal puncture, and then caused to lie down on that side which is opposite to the side of pain. The elevation of the pelvis or shoulders is modified from 10 to 30 degrees, depending upon the region which it is desired to treat, the lighter absolute alcohol flowing always to the top. A syringe which is graduated in 0.1 c.c., which is equivalent to the tuberculin syringe, is used. The injection is made very slowly, drop by drop, so as to avoid mixing the alcohol in the spinal fluid. Depending upon the gravity of the neuralgia, one injects from 0.2 to 0.8 c.c. of absolute alcohol. The patient at once has a sense of heat in the affected territory, followed in ten to fifteen minutes by a zone of hyperesthesia and some points of total analgesia. The tendinous as well as cutaneous reflexes are lessened and often completely disappear, and there is a slight motor disturbance, which disappears completely in a few hours, occasionally within a few days.

The painful symptoms, however, disappear in ten to fifteen minutes. In order to prevent the fluid from affecting the motor roots, the patient, besides lying on his side, inclines somewhat into the prone position. The effect of the injection is to stop the pain or to lessen it, and cure is brought about either directly by cutting out the irritating peripheral stimuli, or by stepping down its transmission through areas in which pain sense is relayed to the brain.

The forty-five cases in which this method was used include: twenty-two cases of subacute sciatica, unrelieved by more conservative methods; nine cases of funiculitis with radicular symptoms, and osteo-articular alterations in the spinal column; three cases of neuralgia of the lateral cutaneous nerve; one case of intercostal neuralgia, due to herpes zoster; two cases of sacrococcygeal neuralgia; two cases of painful stump following amputation; two cases of tabetic girdle pains; and two cases of acute circumscribed pain, (1) the interior border of the foot, (2) of the testicle and anus.

There was amelioration or cure in most of these cases, with the observation that the more diffusely distributed the pain is the better the results are. It is wise, for this treatment, to have the patient in the clinic or hospital, where, if necessary, he can be kept under observation, sometimes in bed, for two or three days. The treatment can be repeated in ten to fifteen days, if the result is incomplete.

Besides the type of cases in which the author has used this treatment, such cases where radicotomy has been used would offer a suitable field for this treatment, such as cases with profound modification of muscular tone, as Little's disease or other painful contractures. The method proposed is considered superior to more peripheral treatment, such as paravertebral or peripheral injections; on the other hand, it is not as serious an undertaking as laminectomy, postero-radicotomy, or antero-lateral cordotomy.

Three illustrations accompany the article.

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between them cannot be determined in advance. The usual practice is to give subcutaneous injections at five to seven day intervals. The exact time and number depend on the local and general reaction. The local reaction is the important guide to treatment. As a general rule, this is never allowed to exceed the size of a fifty-cent piece and the next dose is made larger or smaller on the basis of the previous reaction. Co-seasonal treatment of small repeated doses is sometimes used. Treatment may even be of benefit late in the season. General reactions may be serious and should be avoided if possible. Perennial treatment is based on the assumption that specific doses of the pollen about once a month would give better results. Whether one or more pollens should be used is a matter of judgment.

The results of desensitization are on the whole satisfactory. Whether permanent effects are obtained is still doubtful. In a total of 410 patients with ragweed hay fever who were treated and appeared to have relief of symptoms for at least two years without further treatment, in the meantime, 6.3% were cured; of the remainder, 238, or more than half, were greatly improved, 73 were improved, and 73 were the same. The spontaneous disappearance of hypersensitiveness is well known. How often it occurs is still very difficult to decide. This subject is very large and it is impossible to give you any more than a bare outline of some of the more important features.

Reference: "Clinical Allergy, Asthma and Hay Fever, Francis M. Rackemann, M.D., MacMillan Company, 1931."

SILVER NITRATE AMPULES AND CAPSULES

The A. M. A. Chemical Laboratory undertook an investigation of silver nitrate capsules and ampules to determine whether the market supply was satisfactory. The Laboratory found that the various brands of silver nitrate ampules contained in both wax and glass ampules showed that the strength of the silver nitrate solution is generally somewhat greater than the amount claimed and that practically none of the silver is absorbed by the wax ampule. The quantity of solution found in the glass ampules complied with that claimed. On the other hand, in the wax ampules not only did the quantity of solution vary with each brand, but the products of the various firms differed markedly, ranging from 0.07 c.c. to as high as 0.26 c.c. The Laboratory points to the possible danger from fragments of glass which may form when the glass ampule is opened and which may reach the infant's eye when the silver solution is instilled. The Council on Pharmacy and Chemistry considered the report of the Laboratory and authorized its publication. In recommending endorsement and publication of the report the Council's referee expressed gratification at the reassurance given by the report that the wax capsules do not inactivate the silver nitrate and called attention to the fact that the use of glass ampules may be an open invitation to accident. (Jour. A. M. A., September 5, 1931, p. 706.)

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

BOOKS RECEIVED FOR REVIEW

BULLETIN OF THE NATIONAL RESEARCH COUNCIL. Number 83. A compendium of the statute law of coroners and medical examiners in the United States. George H. Weinmann. 240 pages. Price, paper cover, \$3.00. Washington, D. C.; National Research Council, 1931.

SIMPLIFIED DIABETIC MANAGEMENT. Joseph T. Beardwood, Jr., A.B., M.D., F.A.C.P., and Herbert T. Kelly, M.D., A.A.C.P., both from Diabetic Clinic of Presbyterian Hospital in Philadelphia, etc. 190 pages. Price, cloth, \$1.50. Philadelphia: J. B. Lippincott Company, 1931.

MEDICAL JURISPRUDENCE. Alfred W. Herzog, Ph.B., A.M., M.D., Honorary Academician of the International Academy of Letters and Sciences, Editor of The Medico-Legal Journal. 1051 pages. Price, \$15.00. Indianapolis: The Bobbs-Merrill Company, 1931.

SURGICAL PATHOLOGY OF THE SKIN, FASCIA, MUSCLES, TENDONS, BLOOD AND LYMPH VESSELS. Arthur E. Hertzler, M.D. Surgeon to the Agnes Hertzler Memorial Hospital, Halstead, Kansas, Professor of Surgery, University of Kansas. 301 pages. Price, \$5.00. Philadelphia: J. B. Lippincott Company, 1931.

INTESTINAL TOXEMIA (AUTOINTOXICATION) BIOLOGICALLY CONSIDERED. Anthony Bassler, M.D., F.A.C.P. Illustrated with 16 text cuts, 433 pages with index, reference from Epistle

of St. Paul, dedication—In Memoriam, preface by the author, contents, 4 charts inserted immediately following the index at the back of the book. Price: \$6.00. Philadelphia; F. A. Davis Company, Publishers, 1930.

An incentive to research and a stimulus to painstaking, unrelenting study, the work embodies the treatment of 5,000 patients, seen during a period of 30 years of the author's own experience. The work involved constant research, examination, checking and rechecking, with estimations of immediate results and those apparent years after termination of treatment. The clinical side of the subject is handled with the clinical entity terms in specialty groupings used as headings.

The charts inserted in the pocket in the back cover of the book minutely consider: 1. Cultural Characteristics of the Intestinal Pathogenic Organisms. 2. Cultural Characteristics of the Intestinal Saprophytic Organisms. 3. Cultural Characteristics of the Intestinal Zymogenic Organisms. 4. Cultural Characteristics of the Intestinal Non-pathogenic Organisms.

As a reward for this expression of his life's work may the author's wish in the preface be fulfilled!

LILLIAN L. NYE, M.D.

WHAT THE PUBLIC SHOULD KNOW ABOUT CHILDBIRTH. Gossett. 290 pages, \$2.00. The Midwest Co., Minneapolis, 1931.

There is nothing in this book about childbirth that the public should know. There is a great deal that the public may know. The welfare of the individual patient and the maternal mortality rate can be best served if the public follows a brief instruction that can be summarized in eight words. "Engage your physician early; follow his instructions faithfully."

There is a great deal in this book, however, that the physician should know and also that he may know.

A. G. SCHULZE, M.D.

WANTED—Salaried appointments for Class A Physicians in all branches of the medical profession. Let us put you in touch with the best man for your opening. Our nation-wide connections enable us to give superior service. Aznoe's National Physicians' Exchange, 30 North Michigan Ave., Chicago. Established 1896. Member The Chicago Association of Commerce.

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GRADUATE of medical secretarial course, Rochester Junior College, Rochester, Minn., desires work. References. Address D-152, care MINNESOTA MEDICINE.

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